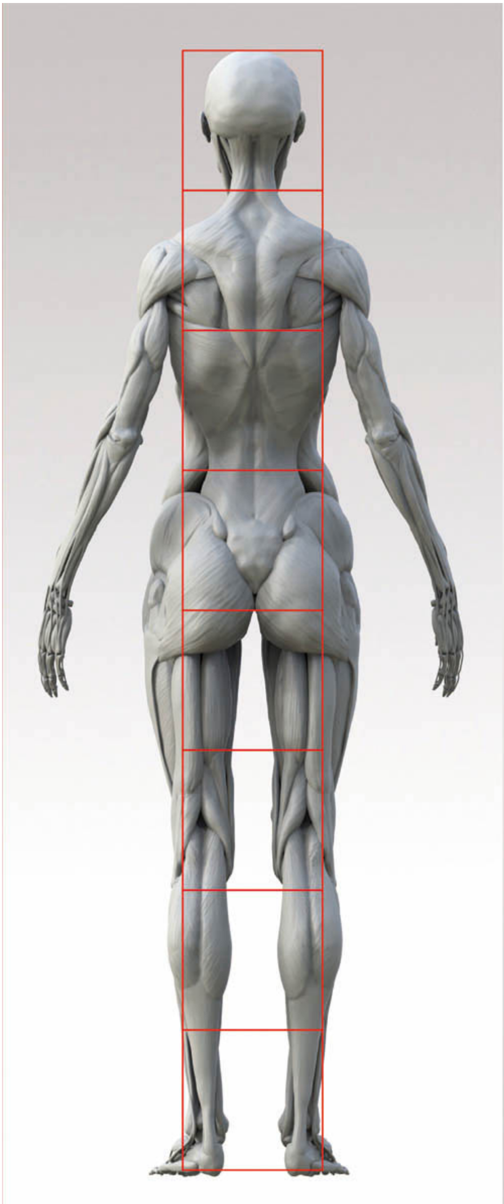

DRAWING THE NUDE

STRUCTURE, ANATOMY AND OBSERVATION

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THE CROWOOD PRESS

First published in 2014 by
The Crowood Press Ltd
Ramsbury, Marlborough
Wiltshire SN8 2HR

www.crowood.com

This e-book first published in 2015

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library.

ISBN 978 1 84797 825 7

Acknowledgements
I would like to thank Eleanor Crook and Scott Eaton for their contributions to this book; James Napier and all at LARA for their support and help in the research process; and Ohio State University's Wexner Medical Centre for the same. Final thanks goes to all students who have attended my drawing classes, and whose work and questions have formed much of this book.

CONTENTS

INTRODUCTION

This book addresses a very particular kind of drawing. The focus is on the human figure, and on the conventions of academic figure drawing that have their antecedents in classical sculpture, and drawing and painting as taught from the Renaissance up until the eighteenth- and nineteenth-century European academy system. Put simply, the visual language we will be working with is focused on achieving the illusion of three-dimensional form in perspectival space. Though everything changed in the art of the twentieth century, the skills required by this sort of drawing are at work in culture today in many forms. Though they are less dominant in painting due to the enormous diversification of fine art in recent times, they are very much present in the fields of animation, graphic novels and comics through to production design and special effects for movies and games. The visual language of computer-generated imagery used in cinema is directly related to the principles here, and sound drawing skills of this kind are still much sought after in those fields. The ideas in this book are presented in such a way that they will be useful to those interested in any of these fields. They are also aimed very much at anyone interested in drawing more generally.

One of the key ideas that governs this book is the notion that a conceptual knowledge of the structure of the body is of great help in the observation of the live model. Artists such as Michelangelo, Rubens or Rembrandt all had a comprehensive knowledge of the anatomical structure of the body, and were able to draw convincing figures from their imagination in any pose, visualized from any angle. The skills possessed by animators and comic artists are of the same kind. Though this book offers an approach to the study of anatomy, it is not focused solely on that domain. Instead, what will be emphasized is the idea that one cannot study something like anatomy without studying the language of drawing at the same time. In fact, the object of knowledge and the ways of knowing it are hard to separate generally; it is perhaps enough to say that a purely medical knowledge of anatomy is not going to improve our drawings.

It is for this reason that anatomy can be a difficult area for aspiring figurative artists to get to grips with, as the information presented in many books on the subject, whilst invaluable, is somewhat separated from the problems of illusionistic drawing *per se.* Anyone who has had the experience of copying out two-dimensional anatomical diagrams only to see little benefit in their figure drawing will recognize this. With this in mind, anatomical ideas will be presented here less in terms of a detailed analysis of the functions of the musculo-skeletal system, but instead in terms of volume

and structure. This will be framed by the introduction of some basic outlines as to what sort of a visual 'grammar' we will need in order to learn to draw the figure.

It is worth saying that drawing the figure from direct observation is not the sole aim here, although the book does end with this as the focus. It is equally an aim to help and encourage the reader to start to draw from memory and imagination. This is an area of illusionistic drawing that is not very often taught. We generally find that the emphasis in figure-drawing classes is on direct observation in the life room, and this emphasis has a lot to be said for it. However, this can sometimes lead to an overemphasis on a sort of looking that is rather two-dimensional. We might pay close attention to shape, line and tonal value and achieve very good results from doing so. But this is not always the case, and there are some drawing problems where a lack of ability to visualize structure becomes very clear. In life drawing, such problems are commonly referred to as 'difficult' poses, though there is a strong argument for saying that all poses are equally difficult, and it is just that certain views can hide 'mistakes' due to our habitual perceptual readiness to see, for example, a standing figure. When we cannot rely on such approximations we become disoriented and draw with less confidence.

Taking this into account, it is the idea of visualization and construction that will be to the fore in our exploration of drawing the nude. The book will begin with an exploration of the basic materials that we will be using, followed by a consideration of the most basic kinds of ideas we will be working with. The aim here is to build up a clear – but very flexible – vocabulary of ideas that anyone can work with. A basic outline of principles of perspective will be introduced, but not at all in terms of the full mathematical depth of the subject. What we will look at is a way of thinking about perspective that can be present in our freehand drawing, that we can carry lightly, as it were. Working like this, 'in the abstract' we might say, allows us to take our time and consider the mechanics of what our drawing language starts to 'say'. We will take advantage of this to think about how light interacts with solid volumes, and also how different forms and densities of imagined structures and materials can be compressed, stretched, warped, distended and so on.

This is not a 'how to' book as such, nor does it push a certain style of drawing. The mode or style used here is primarily for clarity's sake, and is formed by the best way of doing things for me personally. This is not the sort of drawing book that presents a compendium of exquisitely rendered and achieved figure drawings, representing perhaps a decade's worth of work. The intention here is more pragmatic, and is to emphasize process more than product, principle rather than method. Though these principles are guided by an idea of illusionism and accuracy, they would also serve to prompt looser, more improvisatory modes of drawing, or informed distortion and invention.

All the examples in the book are intended to function as exercises to be worked through. Most of the ideas in the book – those that do not involve a model – can be tackled at home, with the simplest of materials. As was suggested earlier, the means of knowing constitutes the object of knowledge

to a large degree, and when it comes to drawing, this means that we know experientially, through drawing, and drawing again. The ideas set out here, then, are best understood by working through them.

PART 1

STRUCTURE

CHAPTER 1

THE BASICS

Materials

There is a whole world of materials available for drawing: many kinds of papers, many sorts of pencils, pastels, charcoals and chalks, all with their varying densities, qualities and quirks. It is easy to get lost in amongst all of this, or even to suppose that certain materials might almost guarantee certain results. It is also easy to put too much emphasis on superficial effects that are not in themselves central to the conceptual processes of illusionistic drawing. Often the matter of surface refinement and manual dexterity is prioritized too soon. So whilst materials and tools are crucial, they perhaps turn out not to matter in quite the way that we may imagine when starting out. The range and function of the materials outlined here are set out with simplicity and flexibility as the aim. With this in mind, it is worth noting that despite the variety of examples, ordinary cartridge paper and pencils would be just fine for working through the majority of ideas in this book if budget and space are limited.

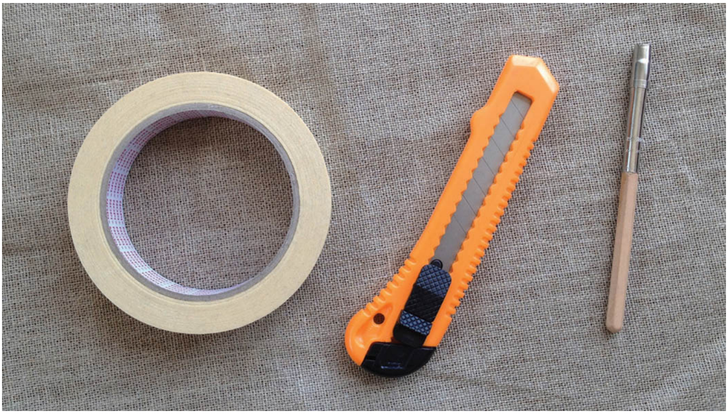


Fig. 1 Basic drawing supplies – masking tape, cutting knife and pencil extender. Having basic supplies in good condition and ready to hand means you can concentrate on just drawing.

Some basic materials and accessories that you may need are shown in Fig. 1 and Fig. 2. Fig. 1 shows a roll of ordinary masking tape, an extendable craft knife and a pencil extender – this in order to make use of pencils that are worn down to stubs, something that will be very useful with certain ways of sharpening described later in this chapter. Fig. 2 shows a paper stump for blending charcoal, a plastic eraser, a kneaded eraser (or putty rubber), and some white pastel – ordinary white chalk can be used as well.

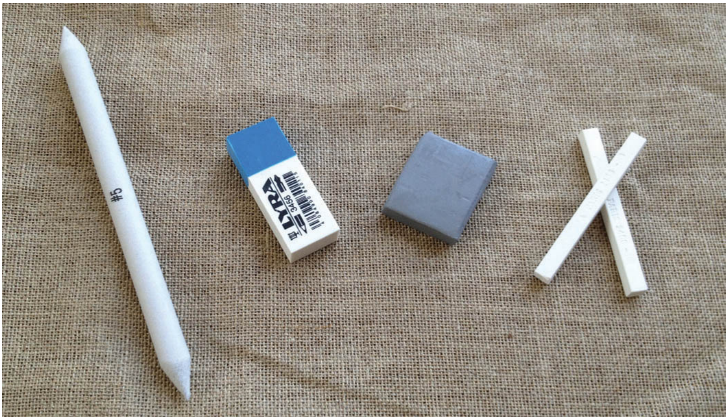


Fig. 2 The tools shown here offer various ways of extending and manipulating drawings. Blending stumps and erasers are as much positive drawing tools as they are for the correction of mistakes. White chalk can be used with charcoal on a mid tone paper for a different relationship to value.

Fig. 3 Stretching a kneaded eraser.

Plastic erasers are used for general removal and correction of lines. They are also a valuable drawing tool that can be used to pick out light shapes from patches of charcoal, for instance. Kneaded erasers require some getting going, and should be rolled and stretched in the hand until they are warm: doing this cleans the eraser, and also means that it can be shaped in different

ways. Twisting to a point will allow you to pick out very small areas of tone, while pinching to an edge will allow you to remove tone in a controlled way, up to a sharp line.

Fig. 4 Shaping a kneaded eraser into a point for fine detail work.

Paper

Newsprint

Newsprint is one of the cheapest papers available. It is excellent for quick charcoal studies and working drawings, and is recommended for short drawings, warm-up exercises, and the general working out of ideas. Cheap and disposable, it has almost no grain to speak of, and so is very smooth. While this means that charcoal can easily be pushed around its surface, it also means that it will not take any building up of tone, and drawings produced on this surface are vulnerable and hard to fix. It should also be noted that this paper is not archival – it will yellow and become brittle with age. Basic A4 printer or copier paper is also useful for quick daily exercises or warm-up drawings.

Cartridge Paper

Cartridge paper is a good general purpose paper with a smooth surface, available in a variety of weights: 130 gsm is a good choice – however, as with all these materials, experiment to find your personal preference.

Fig. 5 Canson brand drawing paper.

Pastel or Charcoal Paper

Pastel or charcoal papers are generally of higher quality and so are more expensive. They are more substantial, and have a more pronounced and characterful grain, and this means that drawings made on these surfaces can be reworked and brought to a high finish if desired. However, it takes time to become familiar with the way these papers behave, and what they can take.

It is common to make a working drawing on cartridge paper and transfer it to higher quality paper for a highly finished rendering, in much the same way that an artist might transfer a sketch to canvas for painting. Despite it being possible to erase and redraw many times on these papers, the surface can be damaged if one is not careful. If marks are made too heavily, the paper can become scored, creating a mark that can be hard to work around. It is also good advice to make sure one has clean hands, as grease from skin can create patches that will not readily take charcoal or chalk.

Toned papers of this sort allow for the introduction of white chalk into a drawing, in combination with charcoal. A different register of light effects is possible with this sort of technique. The paper in this case stands for a mid-tonal value. All colours and darknesses of paper are available. Again this is a matter of preference, but in the beginning, highly saturated colours can be

distracting in terms of understanding how to render light and shade, and papers that are too dark ask for too much work to be done with the white chalk, which can be hard to control. Canson drawing paper is a popular example, as is what is known as Ingres paper. It is recommended that you use neutral colours and relatively light-toned paper at first, but as always, try different types and see what works for you.

Fig. 6 Ingres drawing paper.

Drawing Media

Pencils

Graphite pencils come in a wide variety of grades. The work using graphite in this book will be made with grades 2B, HB and 2H. It is best to buy better quality pencils as they will be made of superior wood, making it easier to sharpen them. Coloured pencils consist of pigment with various sorts of binder – some are waxy, some are close to chalk in texture, others are somewhere in between. It is a matter of personal preference and experimentation as to which you use. Coloured pencils can have a very different feel to graphite pencils, which beginners can sometimes find hard to control, despite their being the most common drawing tool.

Fig. 7 Standard drawing pencils of various grades.

If you are having trouble with being too heavy-handed, try using neutral grey or brown-coloured pencils, which can be a little more forgiving and easier to control. A useful exercise is to split up your drawing into stages, each having a different colour: a lighter one for the general shapes, slightly darker for intermediate forms, and darker still for the details. This is a way of using materials to help you to separate stages of the drawing conceptually, something which can be hard to do at first when using a single material.

Charcoal

The most common type of charcoal available is willow charcoal. Easily erased, it is a more forgiving kind of charcoal, and useful for techniques where an eraser is used as a drawing tool to define the shapes of light areas. However, because of these qualities it is not as easy to build up into rich dark tones. Vine charcoal is similar, providing a rather grey black, though it is more difficult to erase than willow charcoal.

Fig. 8 Willow charcoal is basic and useful to have around. It is easily smudged and erased and is ideal for quick studies.

Nitram charcoal is not as readily available, and is more expensive. It is a brand favoured by those who make drawings that are extremely highly finished, taking thirty hours or more. This very high quality charcoal is capable of a broad range of tones, and is also easy to erase, making it highly flexible. Because it is fired from wood with a consistent grain, it is also easier to sharpen and more resistant to crumbling.

Fig. 9 Nitram charcoal – this type of charcoal can be sharpened to a very fine point and allows great control for the production of more refined work.

Compressed charcoal is very difficult to erase but produces intense and deep black tones. The qualities of all of these sorts of charcoal can be utilized in a single drawing if needs be.

Fig. 10 Compressed charcoal.

Fig. 11 Pastel pencils offer the familiarity and control of a pencil with the softness and tonal range of chalk or charcoal. They also come in a variety of colours.

Sharpening Drawing Tools

It is important to work with a sharp point as this gives a tool that is consistent. A large part of considering materials and tools is to clear the way for us to think about what we are doing. It is often surprising to people just how much of drawing is down to thought process rather than manual dexterity, as it might initially seem. A good pencil sharpener is fine for most purposes, if graphite is what we are using. However, if you are interested in producing finely rendered drawings, and want to use graphite or charcoal to its full potential, then it is a good idea to sharpen pencils in a more specialist manner. Thus charcoal and chalk, and charcoal or pastel pencils will need sharpening with a knife, as a pencil sharpener will damage them.

To do this you will need a large extendable craft knife – it is best to acquire the larger kind as they are easier to handle and safer, and also to choose the plastic-handled variety as their blades are fully extendable, unlike a Stanley knife. For refining the point, use 200-grit sandpaper or similar, and a sanding block. A spare piece of timber will be fine for the job.

To begin, carefully pare back the wood in small sections, gradually moving back up the pencil, turning it as you go. The aim is to expose about an inch of lead. Take care not to cut down into the lead as this will chip it and make it more likely to break. When you have almost exposed the lead, lay the knife flatter and rapidly move it back and forth, again making sure that you are constantly turning the pencil so you are cutting uniformly. You should be producing small ribbons of wood shavings, and eventually be sliding along the surface of the exposed lead. The result should look something like Fig. 14.

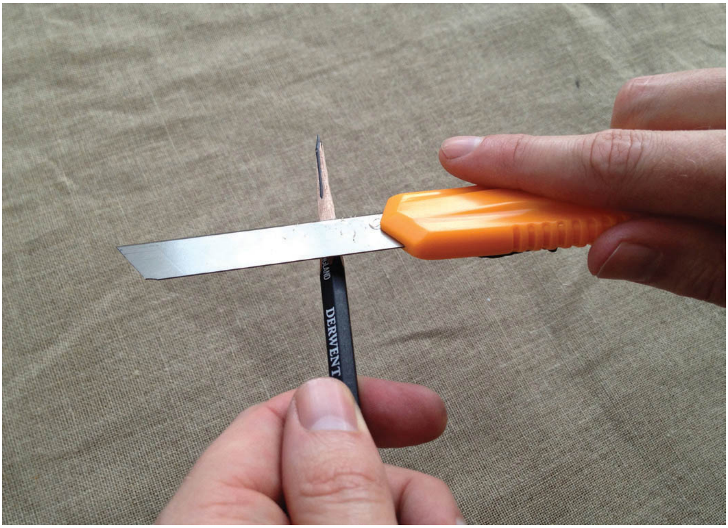


Fig. 12 Wittling away the wood to reveal about an inch of lead.

Fig. 13 Carefully removing the wood in small ribbons to expose the lead completely.

Fig. 14 The exposed lead.

The reason for exposing this much lead is that it can then be laid flat on the sanding block and brought easily to a fine taper with sandpaper. Lay the lead flat on the sanding block and slowly start to move the sandpaper back and forth, turning the pencil all the time. It is very important that you do not

use force or you will break the lead: allow the abrasive to do the work. When you are comfortable with the movement, gradually increase the speed. You should end up with something like Fig. 16.

Fig. 15 Sanding the lead to a tapered point.

Fig. 16 The finished pencil: it is best to do several of these at a time if you plan on working with such a fine point.

Sharpening the pencil in this way means that it is very easy to maintain a needle-sharp point throughout a drawing, as it takes only a short burst of sanding to refresh the tip. With this tool you can work right into the grain of the paper for fine detail and even tones. It also encourages you to hold the pencil further back, which is what we want to do generally. This can also be done with charcoal pencils, though this requires extra care as these are more fragile than graphite.

This way of sharpening takes a bit of practice, so expect a few broken pencils! Also take care not to drop them, as it is the end of pencils sharpened in this way: dropping them will crack the graphite/charcoal down its length, leaving it in fragments. It is a good idea to sharpen pencils like this in batches, so you have several of each to hand. This allows you to maximize your drawing time, which is important, particularly if you are working from the model.

Sharpening charcoal is largely the same process as outlined for pencils above, though of course omitting the stage of whittling away the wood. Using the sanding block, patiently sharpen the charcoal to a fine taper. Again, as with pencils, it is advisable to do a batch of these so that you can concentrate on the work at hand. As charcoal sticks are so fragile, it is a good idea to find a box in which sharpened sticks can be well packed for transport and storage.

Setting Up a Work Area

Whether you are working at home or in a fully equipped studio, correctly setting up a work area is extremely important. Drawing is hard enough without creating further obstacles, so it is important to make sure that you have what you need, that the area is uncluttered, and that you can simply concentrate on looking, thinking and drawing. An easel is necessary if you are working from a live model, in order to see clearly both what you are drawing, and the drawing itself. Of course it is also fine to work with a sketchpad or drawing board on your lap. However, because an easel holds the paper upright, this means that your drawing will not be subject to any optical distortion. It also affords you the opportunity to regularly step back and survey the overall work from a distance.

As with the other materials we have covered, there are many different types of easel, ranging from the expensive and permanent to the relatively cheap and portable. A lightweight portable field easel can be carried easily and packed away for storage. If you are not working from direct observation – that is, you are drawing from memory or copying from the flat – then it is also an option to tape your drawing paper directly to a clear, flat wall. Alternatively you can work at a drawing board propped up on a desk. This is better than working with the paper flat on a desk, as that will create distortion in your drawing because the paper you are working on will itself be foreshortened.

Drawing boards are available from many art suppliers as sheets of ply or birch, and are relatively inexpensive. The advantage of these is that they are soft enough to insert pins into. A thin sheet of MDF would work just as well, though this tends not to accept pins. A very basic thing that a lot of people get wrong at first is the fixing of the paper to the drawing board. It is essential that the paper is secure, and also that it is aligned correctly to the board: this is so that you can judge angles correctly. If the paper is askew, then this becomes more difficult than it already is. It is good advice to consider the four edges of your paper as the first four 'lines' of your drawing, as it were. If you are working on a vertical surface or at an easel, ensure the paper and board are at the right height, so that your eye level is roughly in the centre of the page. Tape the paper down securely, or use bulldog clips to fix the paper to the board. It is a good idea to use these if you are leaving your drawing between sessions, as masking tape can sometimes lose its adhesive power, especially if there are changes in temperature.

Take time before a drawing session to sharpen pencils, organize supplies, and make sure that you have everything you need in advance. Taking the time to set up correctly makes the world of difference to the work that follows. The final and most important ingredient is a defined block of uninterrupted time in which to work.

CHAPTER 2

VISUALIZATION

Once you are more experienced there are myriad ways to use materials, but for the demands of this kind of drawing, there are certainly some ways that are more efficient than others. Some common difficulties that arise when people first begin drawing go right down to the ways that we set up our working situation, and how we make the most basic marks. There is a tendency to hold the pencil as if we were writing, and to press down quite hard. This can score the paper and make thin, dark lines that are hard to move, physically and psychologically. Definitive statements at an early stage of the drawing can almost act like a ‘contract’ that we cannot break, or must be loyal to, but we need to find a way to be both precise and flexible in these initial stages. With the fingertips, hold the pencil near the back, and lightly make sweeping, ghosted marks.

Fig. 17 Making basic hatching marks is a very good way to warm up or practise. Repetition of such a basic thing reinforces your control and level of comfort with your medium.

No force should be necessary in making our first exploratory marks, only the weight of the pencil. Whilst making these marks, rest the edge of your hand on the paper if necessary. You will notice that the length of line that you can make when drawing in this way is much greater than when holding the pencil in a writing position. Drawing this way, we can move the pencil from the wrist, from the elbow, or even from the shoulder to produce broad arcs. You will find that these lines tend to come out naturally bowed – this is fine, and in fact is good for our purposes, as you will see.

Practise and experiment until you feel comfortable with this: use a sharpened 2B, on cartridge paper. Fig. 17 shows some basic hatching marks made in this way. The more usual writing grip is reserved for adding detail, where more precision is needed.

Once you have got used to drawing these broad, ghostly, arcing lines, move on to drawing basic, two-dimensional shapes. Another common problem when beginning drawing is the tendency to draw shapes as fixed boundaries, as if they had been cut out with scissors. Instead of doing this, try to deliberately overshoot your lines, ‘following through’ past their destination. When we do this, it is possible to imagine a sense of ‘carving out’ shapes from the area of the paper.

These are what you might think of as construction lines, used to work out location and placement before committing to a decision. This logic will be common to all the approaches we will look at, and should give you an idea of the sort of repetition involved in a single drawing. First we place, locate and decide on broad information, then we gradually refine. There is a sense of rehearsing and repeating decisions which is important to grasp, especially as, deceptively, many of the decision-making processes are rarely visible in a finished drawing. This is as evident in the drawing of a simple shape as it is in more complex images of three-dimensional form, to which we now turn.

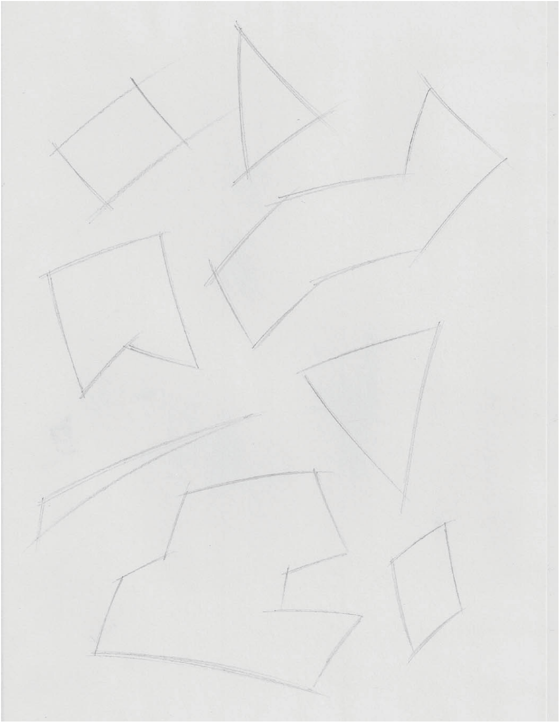


Fig. 18 Basic shapes made with a sharpened pencil. Observe the ghosted quality of the lines. It is possible to be precise yet light and confident in one's mark making.

Basic Perspective

The study of perspective and anatomy go hand in hand, and as we look at the structure of the human body, we should bear in mind that what we are considering is in effect anatomy *in* perspective. All information that we will look at, from the structure of bones and muscles to the way that light interacts with form, has to be put through the filter of the conventions of drawing, and how dust and marks on paper might produce the effect of a coherent image. We are interested in creating the illusion of three-

dimensional form on a two-dimensional surface, and to understand pictorial depth, some understanding of perspective is essential. This is in order not only to develop our sense of structure, but also to have a clearer understanding of what kind of illusion we are making, what kind of pictorial space we are working with.

Academic drawings of the nude can easily be taken for seeming ‘natural’ or of a piece with ‘the way we see’. Of course this is in some basic sense true, however, the suggestion here is that such drawings are a sort of visual language, and so have an internal logic. It helps to understand perspectival space in this way, as a constructed language, as this fosters an emphasis on how it works, and why our drawings produce the effects they do, both desirable and undesirable. Putting the emphasis on academic figure drawing as a kind of sophisticated artifice is not to say that it doesn’t have a close relationship to our perception, just that it is one way of interpreting and communicating among many. Artists of the early twentieth century such as Braque and Picasso, along with philosophers and physicists, became increasingly interested in how our experience related to time, and how it was, in a sense, in constant flux and movement. The characteristic visual ‘judder’ of Cézanne’s paintings is a clear example of when an artist sees the mobile perception of the body in time not as an obstacle, but as something very much of interest.

The kind of perspectival space we are dealing with in this book is, however, best thought of as operating as something like a frozen moment. If we remember this, we can understand more clearly what is happening when we face problems in figure drawing. Anyone who has attempted life drawing will recognize those moments when one part of the drawing seems fine, and another part too, but that there is ‘something amiss’ with the whole. This can, of course, be for number of reasons, but a very common one is that the eye and mind have acclimatized to one area of the drawing and have started to take this as the datum, where once another part had been the anchor. We then have a drawing whose parts are developing as if in different ‘time zones’, and an oddly disjointed result. Add to this the attempt to render light, shade and texture, and we might emerge with an unintended image of a warped or distorted body.

This could have happened because our own position may have shifted, or because we may have drawn different parts of the body effectively from different positions. We may start out seeing the whole, then become fixated on one area – the face, for instance – and, losing sight of the whole, make that area much too large. In many ways, learning to draw is to learn a different way of seeing that at first feels very unnatural, and a different sort of method of working to counteract our tendency to fragment and scan our visual field. We shall take up such ideas again in the third section of the book, when we consider the process of observing the live model.

Understanding the logic of perspective in even just a very basic way can give us another way of holding on to the sense of breadth and consistency that we need to have in order to create the illusion of form. However, this is very much a broad description of these different systems – if you look at the history of European painting you will see various exceptions to the rules. As

the artist Eugene Delacroix said, artists should learn anatomy and perspective absolutely thoroughly – and then forget them, the idea being that a dense residue of understanding would be left which can be creatively warped, slurred, and made to serve the artist rather than the artist being a slave to technical issues. We should bear this in mind as we move through the principles covered in this book, which are presented as clearly as possible, as if in simplified 'lab conditions'.

The following diagrams give a basic outline of the workings of one- and two-point perspective. After this will be a consideration of how these principles relate to a looser, more freehand mode of drawing.

Fig. 19 One point perspective horizon line.

Fig. 19 shows the beginnings of our perspective drawing, and is a case in point about how marks can be interpreted, and how relationships can be specific or ambiguous. On the one hand this image is a rectangle divided by a line, or two rectangles, one atop the other. But instead of these readings we are going to consider the outer bounding rectangle to be something like a window, and the horizontal line within to represent the horizon; from here on we will refer to the outer bounding rectangle as the 'picture plane'. The reason for indicating a horizon is that perspectival drawing is a way of communicating the phenomenon whereby parallel lines appear to come together the further away from us they get. The simplest way to visualize this is to imagine the example of a road, as indicated in Fig. 20, where the parallel outer lines of the road converge at the horizon, and so 'vanish': hence the term 'vanishing point', for the place on the horizon where this happens. Picture plane, horizon line and vanishing point: these are the three elements that form the basis of perspectival space.

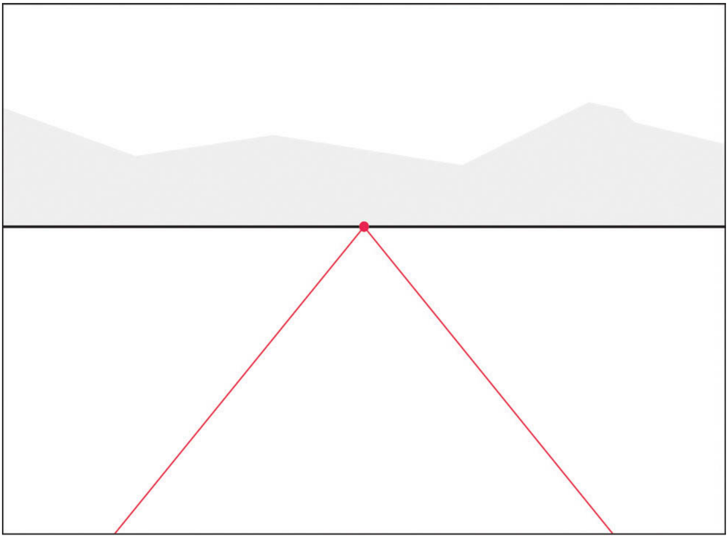


Fig. 20 The edges of a 'road' converging as they recede into space.

EXERCISE: **CREATING A SIMPLE PERSPECTIVE IMAGE**

The best way to understand principles like this is to demonstrate them to ourselves. For this exercise, we will create a simple perspective image of two rectangular box forms. Fig. 21 shows a preview of what we are aiming for. You can use a straight-edge at first to help you understand the ideas, though it is also recommended that you try to do some free-hand versions of this as well. This will provide a kind of warm-up for our freehand drawings of basic volumes that we will come on to later. Do not aim for microscopic accuracy: we are looking only for a general feel for the principles here, rather than an architectural or engineering drawing.

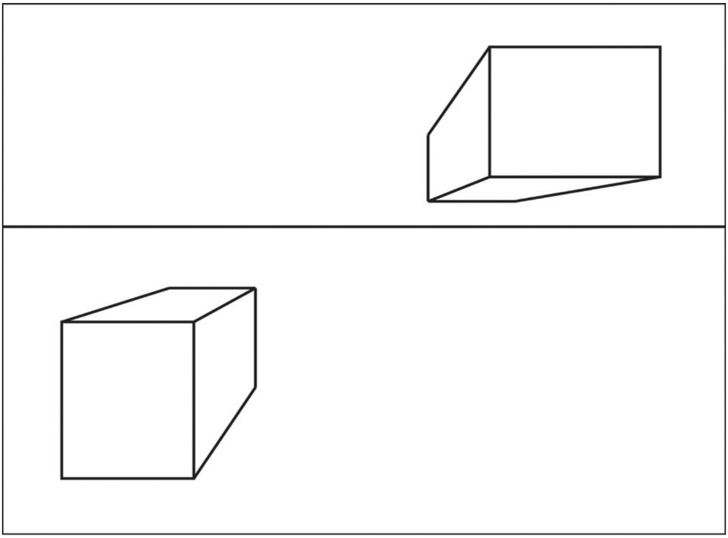


Fig. 21 A basic one-point perspective image of two cuboid forms.

1. On a blank sheet of paper, draw out a rectangle to represent our imaginary 'window', or picture plane. As in Fig. 20, make a horizontal line to represent the horizon. You can place this anywhere you wish, but for the first attempt it is recommended that you follow the diagrams here.
2. As in Fig. 22, mark a point on this line – this will be our vanishing point.
3. Referring to our target image, we can think of these blocks as having their frontmost planes pressed flat up against the glass of our imaginary window. Notice that the lines of these planes are perfectly horizontal and vertical. This is something that is characteristic of a simple example of single-point perspective. The next step, as in Fig. 23, is to draw these front planes – these can be drawn anywhere, and in any proportions you wish, though if you are unsure, as before, simply approximate the example diagram.
4. The next step is to draw some construction lines that connect each corner of each rectangle to the vanishing point. These lines do a particular job: they calculate for us the rate at which these forms would diminish as viewed from a fixed position. We then have to make a decision as to how far back into space we want our boxes to go, and connect these construction lines with horizontal and vertical lines, repeating our initial shape at a smaller scale, as you can see from the diagram. It is very important that these second, smaller rectangles are made up of true horizontal and true vertical lines, in the same way that the initial boxes are, otherwise distortion will occur.
5. We now have what can be thought of as a representation of our blocks, but as if they were transparent: that is to say, all edges and planes of the blocks are shown, even those that we would not see if they were solid. This idea of understanding a form 'in the round' will be very important when we consider anatomical structure later on, where we will be thinking about the cross-sections of the bones and muscles in space.

6.The remaining task for this exercise is to darken the lines we want to keep, and to erase the construction lines, so that we end up with an image such as is shown in Fig. 21.

Placement of the Horizon Line and Vanishing Point

- Placing the horizon line high up the page will give us a high, or 'bird's-eye' point of view
- Placing it lower on the page will give us a low, or 'worm's eye' point of view
- Placing the vanishing point in the middle will create a symmetrical distribution of perspective recession
- Placing it to one side will create a more oblique, or dynamic effect

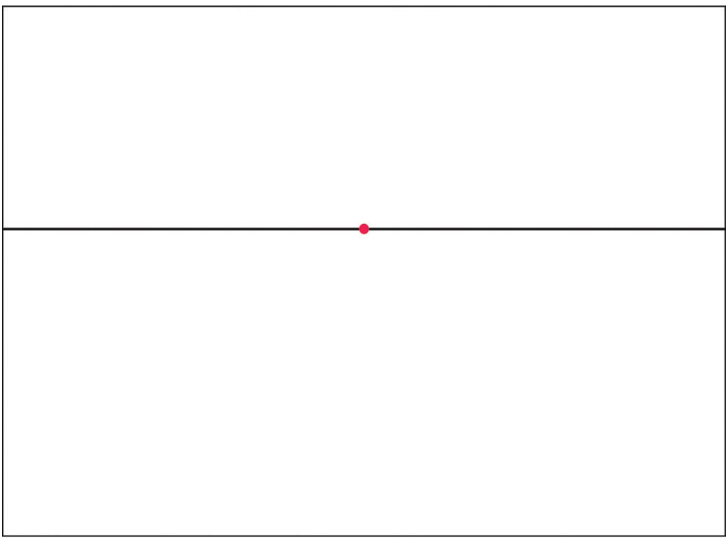


Fig. 22 Horizon line and vanishing point.

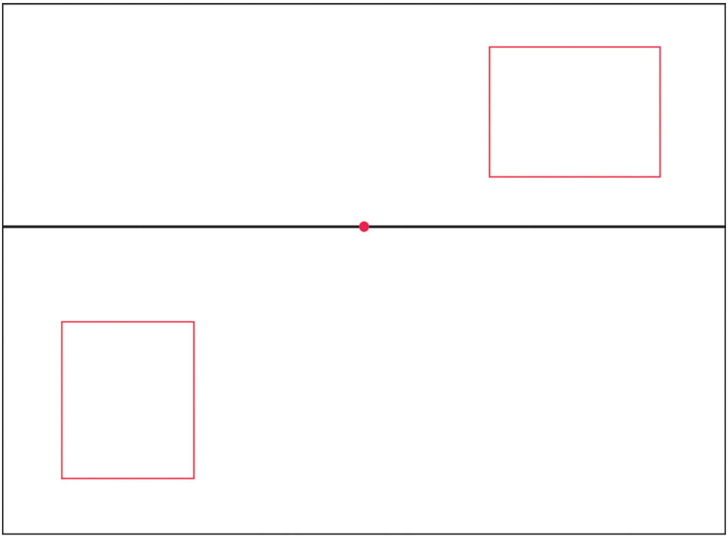


Fig. 23 Establishing basic planes.

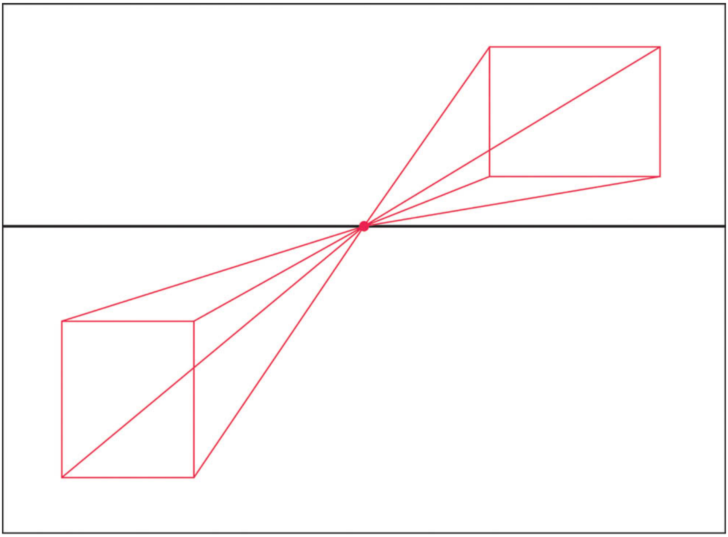


Fig. 24 Extending planes back to vanishing point.

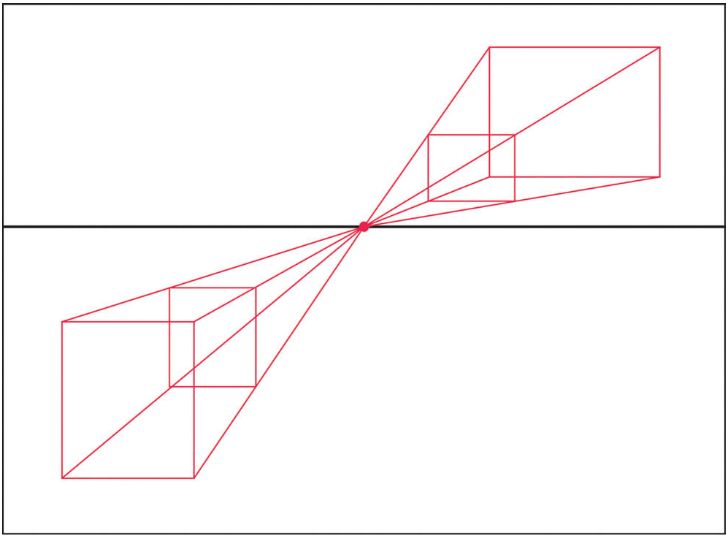


Fig. 25 Deciding on depth of box forms.

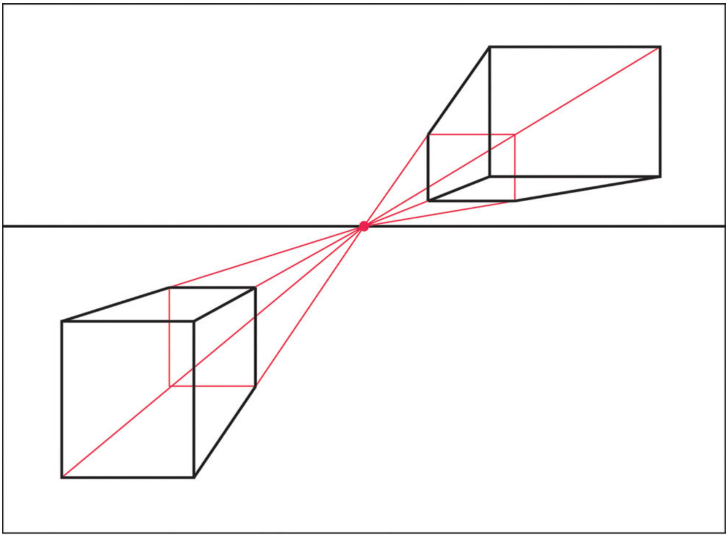


Fig. 26 Finalizing the drawing.

Two-point Perspective

The next exercise is very similar, but here we will introduce another vanishing point, to construct a simple object in two-point perspective.

1. As before, we will begin with establishing a rectangle for the picture plane, and a horizon line.

2. Next, instead of establishing one vanishing point in the centre, we will mark two, at either end of the horizon. It is best if these are as far apart as you can make them without them being at the extreme edges of the picture plane at this point.
3. For our block forms in one-point perspective, we imagined that the front facing plane was pressed up against the glass of our imaginary window. Here we will imagine that it is now the near-vertical edge of the block that is in contact with the picture plane. To represent this we will draw a single vertical line, and in doing so decide upon the height of our block.
4. From each end of this line, construction lines are drawn towards both vanishing points.
5. Again a decision needs to be made as to how far back we wish the block to extend; we then draw a vertical line to mark the end of each of the two receding planes.
6. At this point we could darken these lines and end with a finished block. The following diagrams also show further construction lines in order to understand the structure of the block as if it were transparent.
7. As before, we can darken the lines that we would see if the block were solid. Also demonstrated is a way of finding the centre point of a rectangular plane in perspective – that is, by simply joining the diagonals as one would do for a twodimensional square.

Drawing from Invention

It can be disconcerting at first to have free rein over the dimensions of the forms we draw in this way, especially if we are unfamiliar with perspective. But this is something to experiment with, as we want to familiarize ourselves with how this space works, and to get used to inventing forms.

Fig. 27 Horizon line.

Fig. 28 Horizon line with two vanishing points.

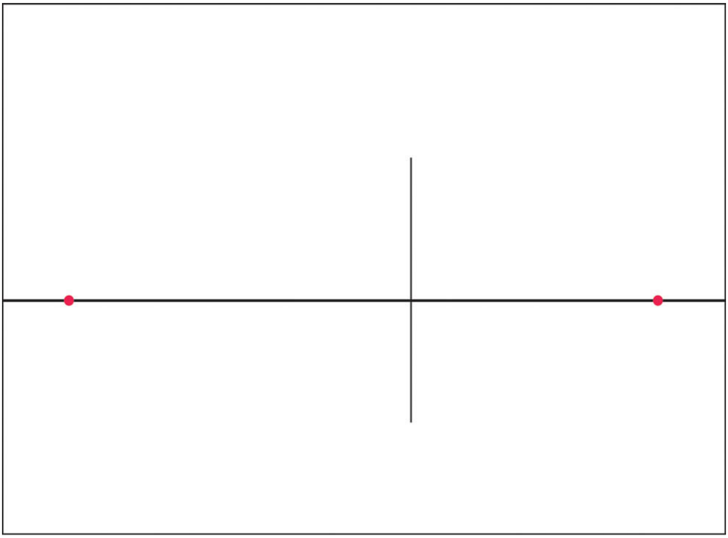


Fig. 29 Establishing the corner of the block.

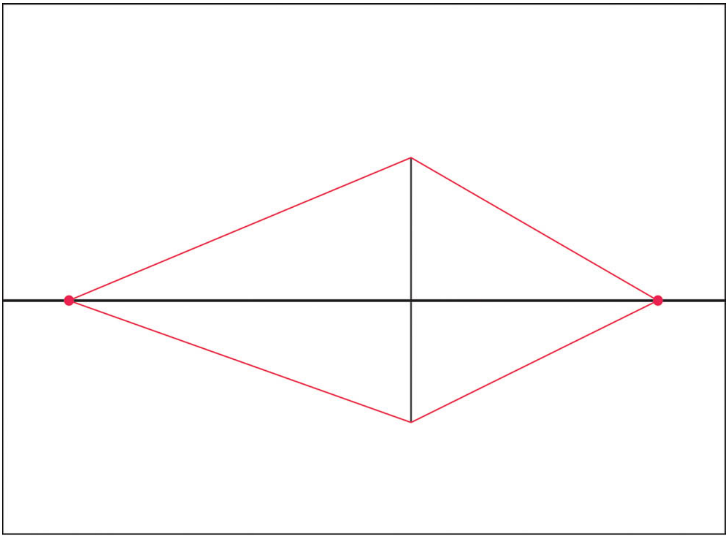


Fig. 30 Extending back to vanishing point.

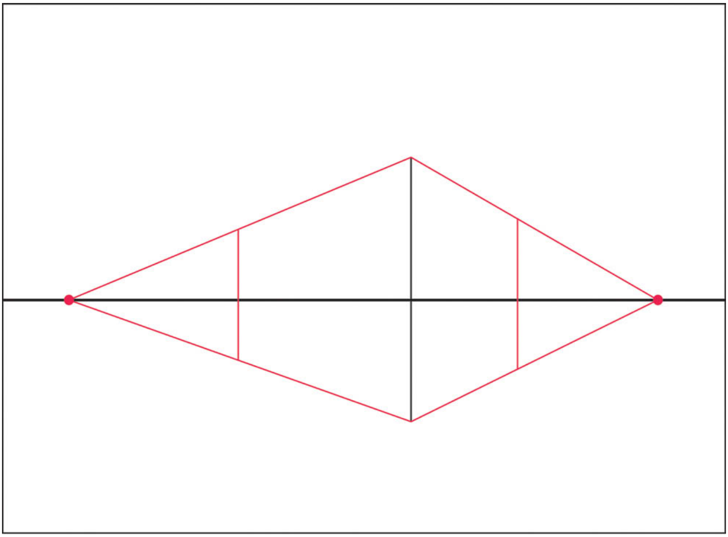


Fig. 31 Establishing depth of block.

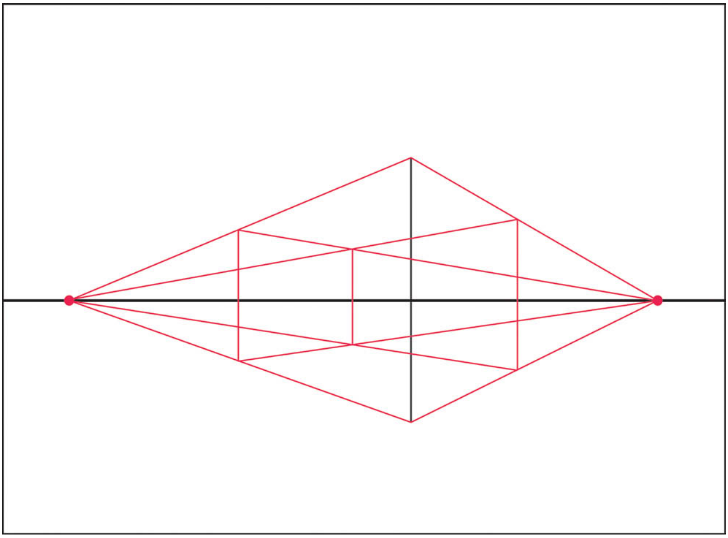


Fig. 32 Drawing through the block to delineate all planes.

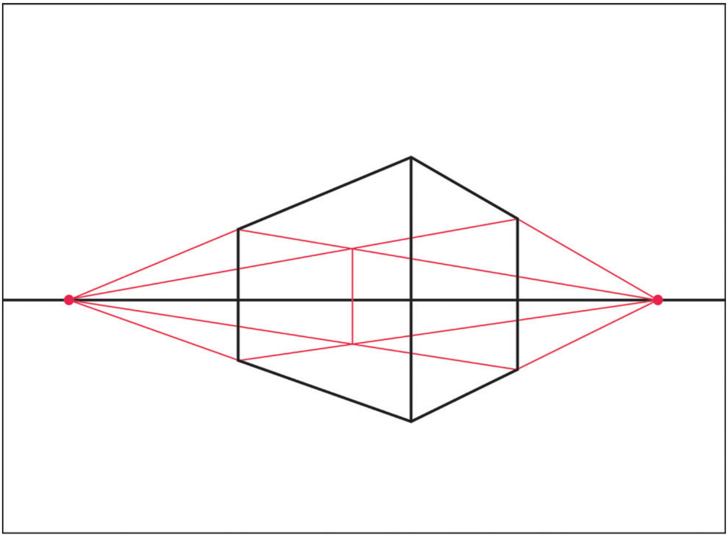


Fig. 33 Finalizing the drawing.

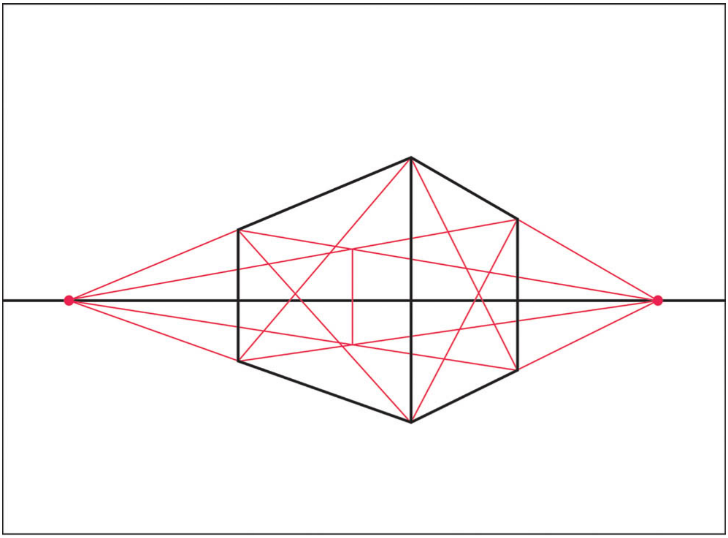


Fig. 34 Finding the centre of each plane.

Three-point Perspective

As you can see from Fig. 35, another perspective system utilizes a third point to control the recession of planes. In the same way that two-point perspective introduced a greater degree of subtlety into the way that the side planes of our blocks diminished in size the further away they were from our imagined viewing position, three-point perspective does the same for our vertical lines. Here, these too gently converge towards one another the further they are from our viewing position. Note here that the viewing points are positioned outside the picture plane itself. The positioning of vanishing points can produce effects that are something like the variations in different camera lenses. If the points are too close together, objects appear to recede too sharply.

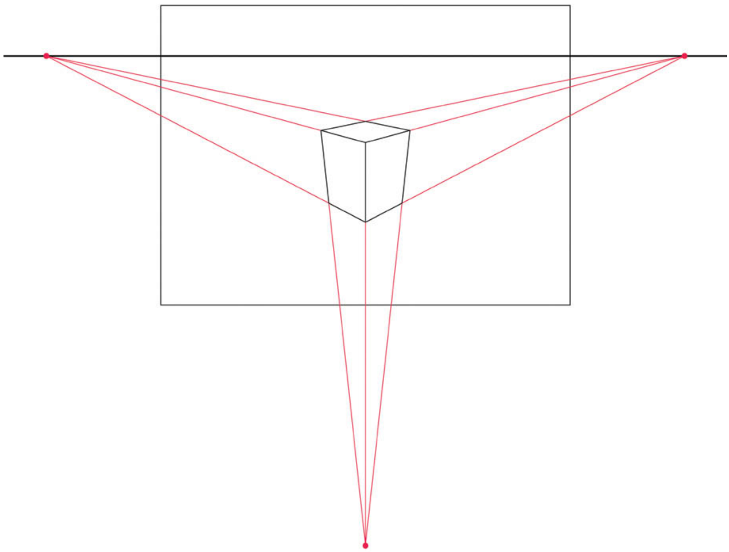


Fig. 35 Three-point perspective.

Points to Remember

We won't construct a horizon and vanishing point in life drawing: studying perspective is to help us understand how this sort of space works. This also teaches us something about variety – note that after studying two-point perspective, the blocks drawn in the first exercise look slightly less convincing spatially: this is because the front and back planes of the blocks are composed of true horizontal and true vertical lines. This is a simplification, and two-point perspective creates a more convincing effect of recession.

The same happens again for three-point perspective and the vertical lines in the image. As you can see here, even the edge contours of a simple block form do not appear as visually parallel, even though we know them to be so.

It is worth repeating that the principles of perspective are introduced here not with any idea that we might be able simply to 'calculate' a drawing, but instead to aid in the conception of simple volumes in freehand drawing, as we shall see in the next examples.

Freehand Perspective and Basic Forms

Simple Volumes

For figure drawing, and in order to understand anatomy, we need to find a way to merge an understanding of the abstract principles of perspective covered in the last section, with the fluidity and flexibility of freehand drawing. To this end, this section will introduce some ideas about developing a simple vocabulary of geometric volumes as a basis for building a conceptual model of the body.

Basic Forms

Following on from our perspective examples, begin by drawing simple three-dimensional volumes freehand, as best you can. You may want to try adding additional box forms to the perspective drawings you have already drawn, but without using a straight-edge. Do not worry about finish or accuracy just yet – what we are aiming for is to develop a tactile sense of an imaginary space beyond the surface of the paper. This will seem frustratingly shallow at first, but the more you practise, the more you will be able to 'reach in' to the drawing and carve out form. Produce many drawings of simple volumes, as in Figs 36 and 37. Concentrate especially on box-like forms. Some approaches to drawing take the spherical or egg shape as the most basic form.

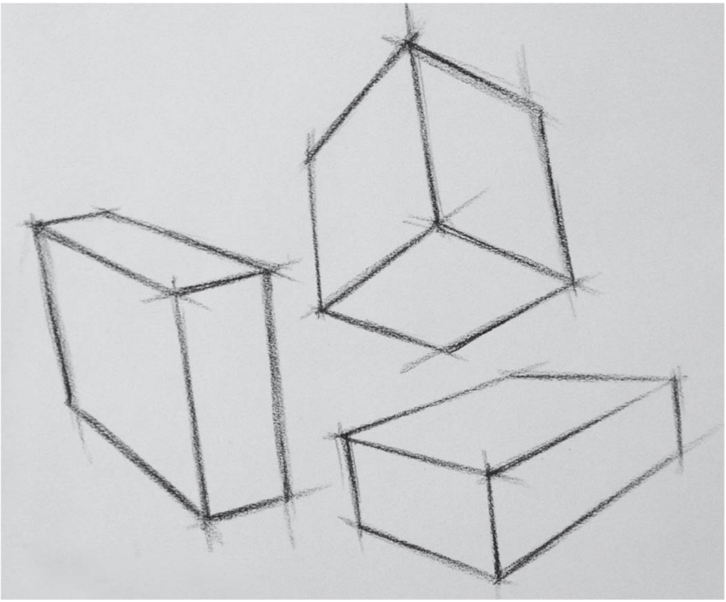


Fig. 36 Practise drawing basic freehand box forms from every angle you can imagine to develop your sense of form.

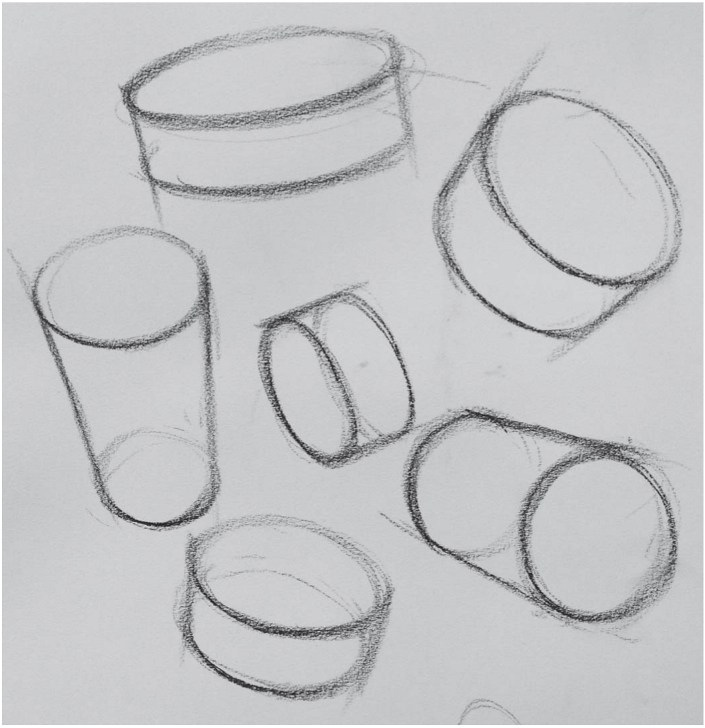


Fig. 37 Basic freehand cylinder forms.

There are many advantages to thinking of the forms of the body in terms of these volumes, as we shall see later on, but there are disadvantages to the beginner. This is mainly the case in that, if one draws a circle on the page to represent a sphere, the orientation of this object in space is not clear, as the contour of a sphere will appear the same from all points of view. This is not true of a box form, however, as the planes of such a form force us to decide on directions in three axes. It is useful to have something like a matchbox to hand that you can refer to if you run into difficulty, but it is very important here that you do not 'copy' what you are seeing. This way, you will develop your capacity to visualize a simple form in pictorial space.

Though these drawings are not to be constructed with vanishing points and horizon lines, our knowledge of perspective sensitizes us to notice if the way lines converge away from us is too acute, or not sharp enough. All complex forms can be visualized as being made up of simple volumes, or as being contained by such forms. Figs 38 and 39 show the relationship of facial features to simple forms such as the box and the cylinder.

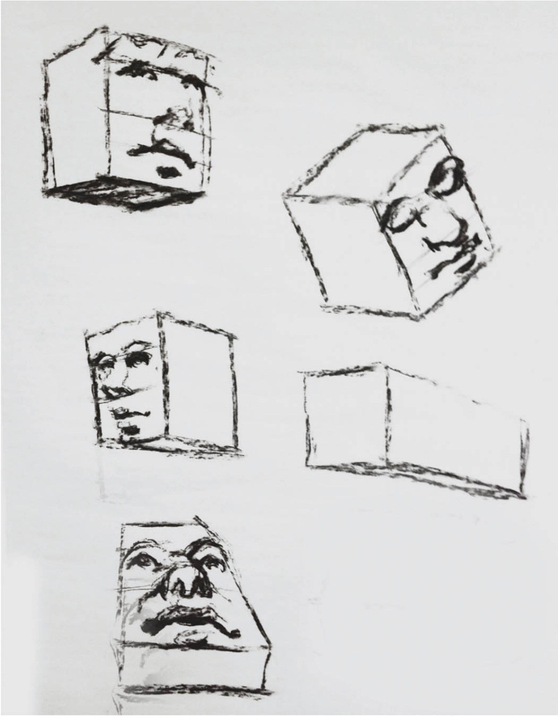


Fig. 38 This image shows facial features in relation to box forms. Being able to think spatially is invaluable in dealing with the complex organic forms of the body.

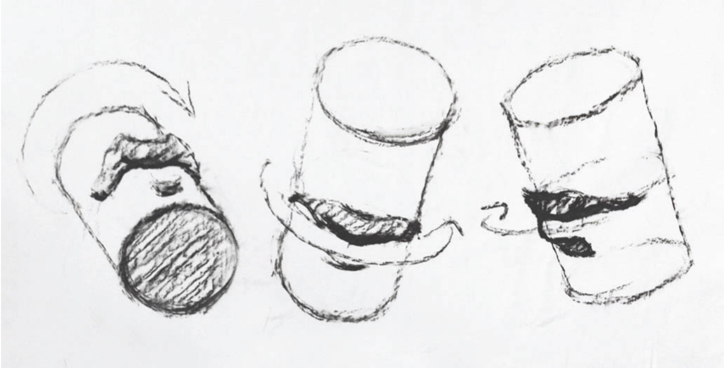


Fig. 39 The lips in relation to cylinder forms demonstrate the way that the lips curve around the structure of the dental arch, rather than being placed flat on the face.

Contour Lines Versus Outlines

When first starting to draw, it is common to think primarily in terms of

shape and ‘outline’. An outline can be thought of as a sharp boundary, like a fence. In the examples given in this chapter, we are introducing the notion of the contour. The contour of a form can be imagined by thinking of a map on which contour lines indicate changes in topography. What we are looking for, in order to understand the figure, is a sense of the ‘terrain’ of a form, rather than simply its optical boundary.

Fig. 40 Egg forms with contour lines.

Fig. 41 This image shows an egg form with contour lines: try drawing over the surface of basic forms to develop a tactile sense of structure in your drawings. This will pay dividends later on and will show in your work.

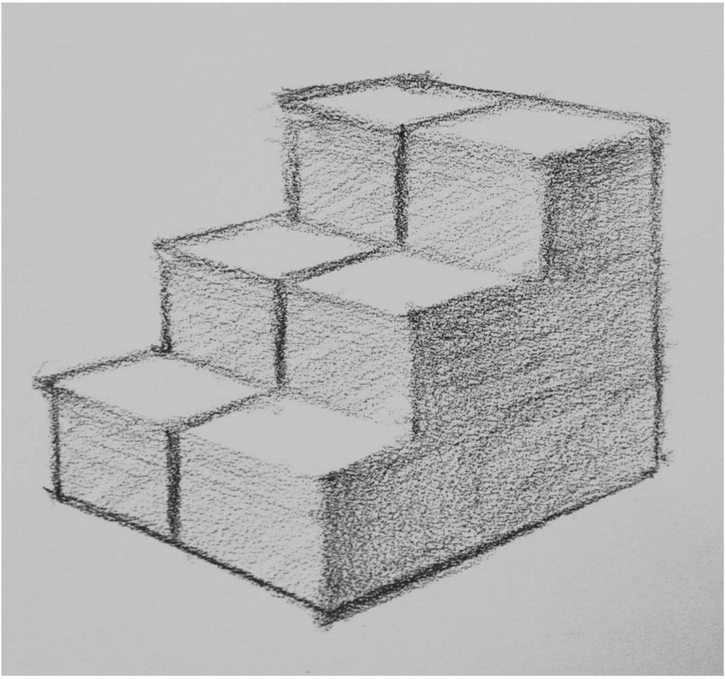


Fig. 42 The idea of a contour line can be imagined as being something like a path or trail left by something moving over the object's form.

Fig. 43 Here we can see the same example applied to the more complex form of the head.

Figs 40 and 41 show simple organic forms with lines running over them. Imagine an insect crawling over the surface of the form, leaving a trail that describes its path. This could move in any direction, and so we can run our contour lines anywhere we wish once we have a sense of our terrain.

Fig. 42 shows a simple image of a stepped form. Pay close attention to the line running down these steps – this is again a contour line, describing a path leading down the steps, as it were. However, the primary thing to notice about this example is the fact that thinking in this way means that the line at the far left of the form is now no longer simply its ‘outline’, but rather it happens only to be the contour line that is furthest from us before the form turns a corner, or drops away. Consider this in relation to our perspective examples, where the initial image of the road had an indication of mountains in the distance. The line representing the tops of these mountains is also merely the furthest terrain line, or contour that we see from our point of view before the surface turns away from us. The horizon line can be thought of this way too, and as we know, this is a line that is never reached no matter how far we travel.

Fig. 43 shows an image of a head constructed from memory, which shows many contour lines describing it and running over its surface. In this way of thinking, all lines are contour lines, and should be made to do their descriptive work.

Basic Light and Shade

It is useful here to introduce some basic concepts of light and shade in relation to these ideas about form and space. There are many things we must consider when beginning to think about the development of the illusion of form and space in our drawing. These later phases of a drawing are known by various names, such as modelling or rendering. Later in this book we will be thinking about the division of light and shade in terms of a five-step value scale, 'value' being the term we will use to refer to how light or dark something is.

Light and Basic Form

In order to create the illusion of light striking a surface, we initially need some way of conceptualizing what is happening. This is a recurring theme of this book, that there is more going on in an illusionistic drawing than a straightforward notion of 'copying'. We cannot copy reality, something that seems clear when we consider that we only have a flat surface and some form of dust, be it graphite or charcoal, with which to selectively darken that surface. Sharpened perception is, of course, essential, but the realization that it is how those perceptions are organized and communicated is actually very often empowering for beginners, as well as important to remember for those more advanced.

Our example here will be an image of a basic pebble or rock, constructed from imagination. A common phenomenon in drawings that do not effectively convey the illusion of form and space is a certain sort of patchy quality. This tends to come from our attention settling on an isolated detail here, another there, and so on, and the subsequent rendering of each in a disjointed way. Fig. 44 is an exaggerated example of this.

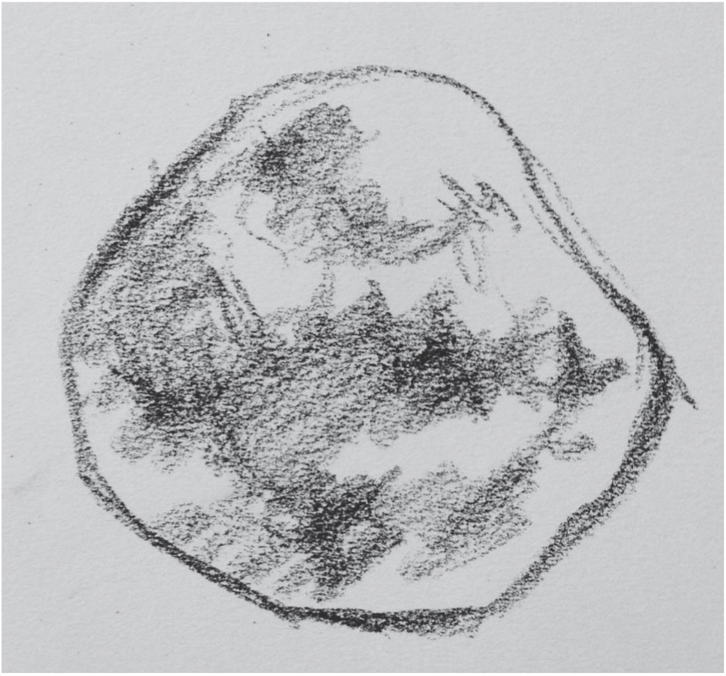


Fig. 44 This example demonstrates problems arising from disorganized tonal values – it is hard to see what is meant to be shadow, and what is meant to be surface texture.

Such a 'nomadic' attention to what we are drawing also means that it is likely that, when staring into the shadows, for example, our eyes will acclimatize to that area, as they do when looking into a bright area in isolation. This may mean that we are using an entirely different value range in different parts of the drawing. Thinking of things in this way should explain the frustration that can be felt when, despite feeling that one has painstakingly and faithfully rendered each part of the figure with a great deal of effort, the result is not satisfactory. This book offers concepts and tools, rather than rules, as such – but perhaps there is one general rule to hold on to, and that is to move from large to small, and from the general to the specific.

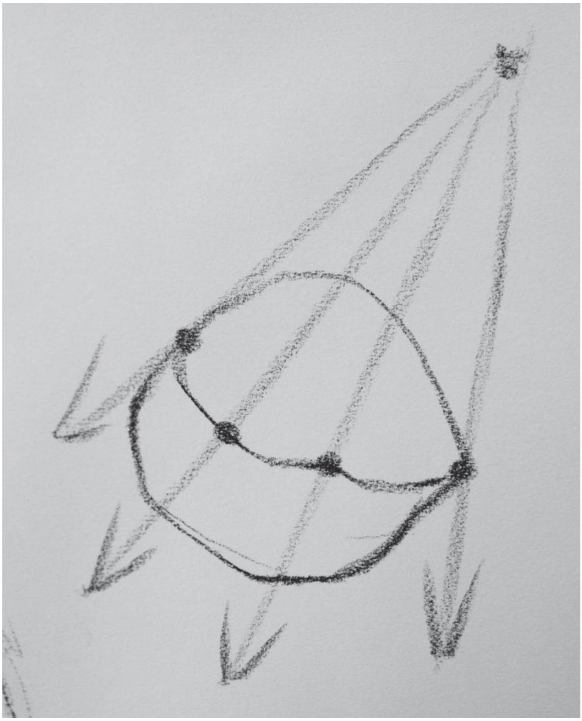


Fig. 45 The shadow line in relation to a cone of light. The point at which the light rays pass tangentially to the contour is where the true shadow line begins.

If we imagine a light source coming from above and to the right, Fig. 45 shows the path of light rays as they strike our pebble object. As the form rolls away from the light it becomes progressively darker – but there is a point at which light rays pass the object at a tangent to its surface, and we can imagine a line running through these points. This is what we will call the 'shadow line', and it marks the most basic separation of the light areas of the form from the dark areas: think of the stages of a lunar eclipse as an idea to clarify this.

Fig. 46 shows a simple diagrammatic representation of this on our pebble example. It is this separation that we want to maintain throughout the drawing, and to which all detail and textural information must be subordinate. Note that the shadow line is itself a kind of contour line, in that it describes the terrain of the object. This is why the observation of shadow shapes will be so crucial in Part 3, as the shape of shadow lines reveals the form.

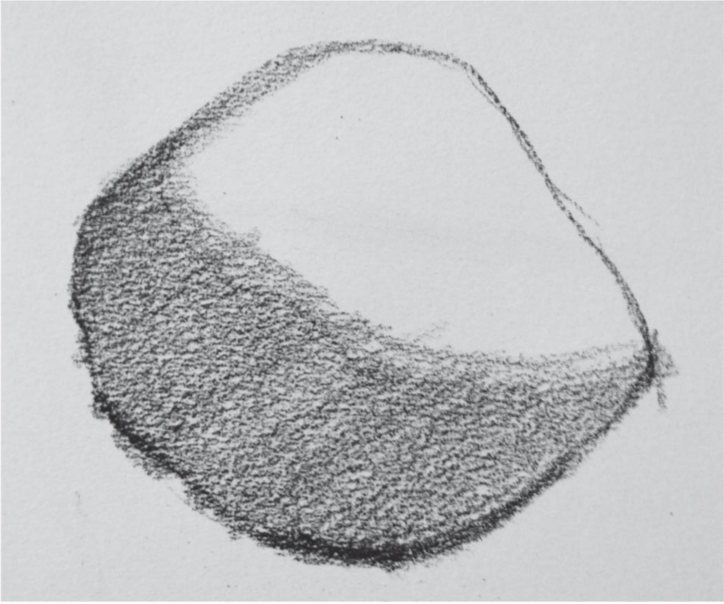


Fig. 46 It is important initially to make a clear separation between light and shadow in your drawing, even if this feels a little artificial at first. Our perception and vision fluctuate, focus and refocus on the model, so in a sense, stability has to be forced or insisted upon at the outset.

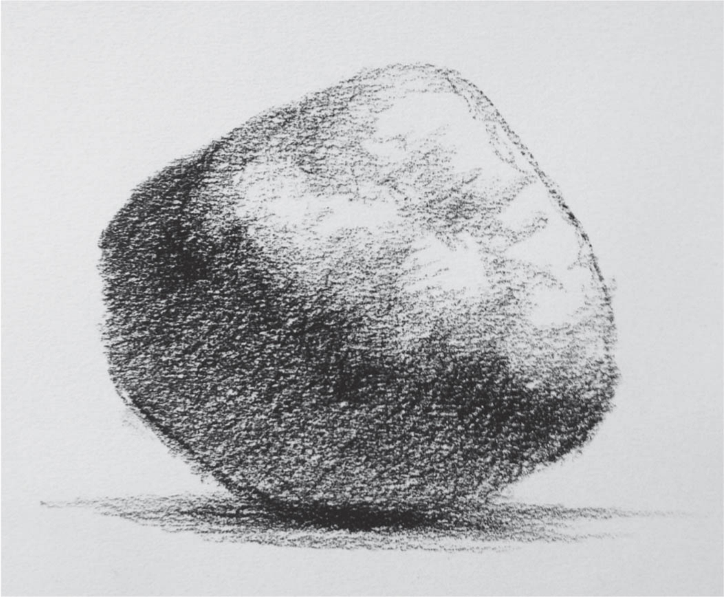


Fig. 47 The separation of light and shade is maintained as the drawing develops. Surface texture is subordinated to it, and respects its boundaries, even as the distinction

becomes more refined.

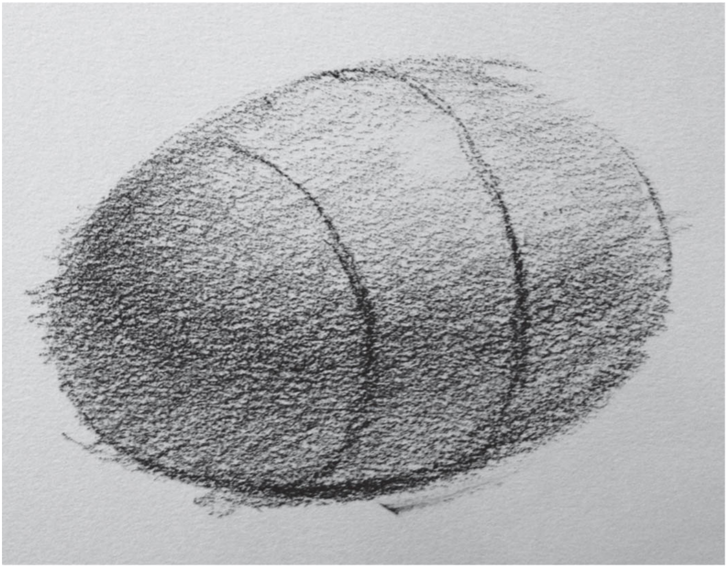


Fig. 48 This example shows contour lines responding to the prevailing light conditions, becoming darker in the shadow and lighter in the light. Again this sometimes means not drawing what we see, and letting the needs of the drawing predominate.

Fig. 47 shows a more fully rendered image of our pebble, illustrating these basic concepts. In the light areas of the object we have a general tone and a bright highlight tone; in the shadow areas we have the general tone and the reflected light, as well as the darkness of the shadow line itself. This is the darkest part of a shadow, as it is the point at which the least light is striking an object. From here on in, light is bounced back from the general environment, creating a reflected light. Think of how a portrait photographer might use a ‘fill light’ to bounce light back into the dark side of a sitter’s face in order to create a fullness of form.

Fig. 48 shows an egg form with contour lines – but note here how these contour lines partake of the changes in light and shade on the object, reminding us of how we need to subordinate detail to the larger lighting conditions.

CHAPTER 3

FURTHER VISUALIZATION

Develop the Visualization of Basic Forms

In order to stretch your capacity to visualize and invent forms, this chapter will begin with some exercises to help develop habits of visualization. What we are working towards is the ability to visualize the structure of the body from our imagination, either in order to work that way solely – as in the case of an animator or comic book artist who does not depend on reference material for every image – or in order to better inform observational drawing from the model, as we shall see in Part 3. Of course, there are in-between points too, in that such skills make us better able to select and interpret from photographic reference, for example.

Fig. 49 A cylinder drawn as if transparent. It is important to attempt to visualize the form in the round as much as possible.

Returning to the ideas of the basic forms of the cylinder – the sphere/egg and the box introduced in the last chapter – the first examples here show these forms drawn repeatedly from imagination. This is an excellent exercise for building your command of form. As mentioned in the previous chapter, when you first begin this, your pictorial space will feel very shallow, and it will be difficult to get the forms to 'turn'. The development of this skill is very much a matter of repetition, experimentation and continued application: the more you do it, the more that your feel for form and for pictorial space will develop.

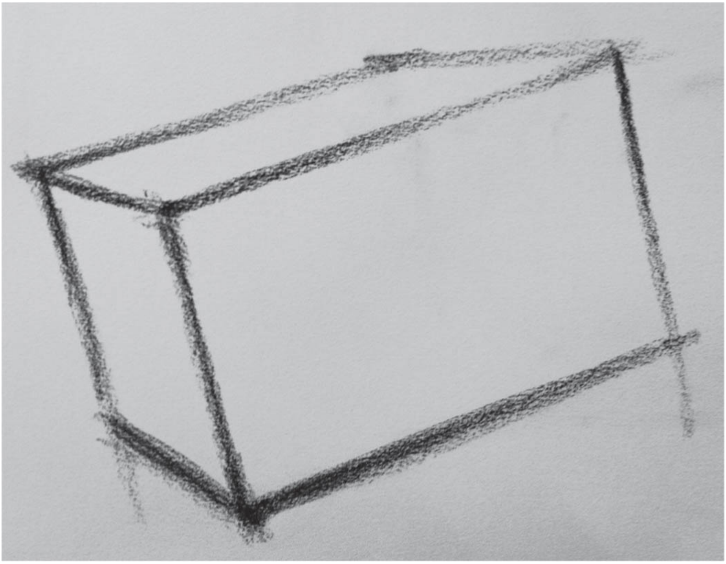


Fig. 50 A box form: note the subtle convergence of lines as the top and side planes recede from our point of view.

Like all fundamental skills, such as scales in music, this is deceptively simple, and in fact it takes a good deal of time to get a comfortable grip on it. However, it is worth the investment because every anatomical form we will look at later on will be made up of these basic forms or variations on them, so if you can visualize these with confidence, in theory you can draw anything. Grafted on to these skills, anatomy then becomes a very specific kind of information or vocabulary, expressed in terms of form, and the acquisition of that information allows you to draw and understand the human figure better. When you understand this, it becomes clear that this is how you can learn to draw anything from your imagination once you have acquired the relevant information, be it the anatomy of another animal, the construction of a particular type of machine or object, or hybrid forms derived from many sources.

Practise drawing these elementary forms in every position you can conceive of, and from every point of view also. Consider and try to express different proportional relationships, too: for example, make some cylinders long and thin, others squat and barrel-like. This aspect is crucial, as it is often the case that we tend to have an affinity for particular proportions – some people's drawings tend towards the long and thin, for instance – and so need to make sure we are being as varied as we can in our practice, and exploring the full range.

Begin with box forms, then cylinders, then eggs and spheres with contour lines running over them. Short bursts of focused practice of this kind done daily over a period of months can make a huge difference to your drawing, and the more work done on this, the better.

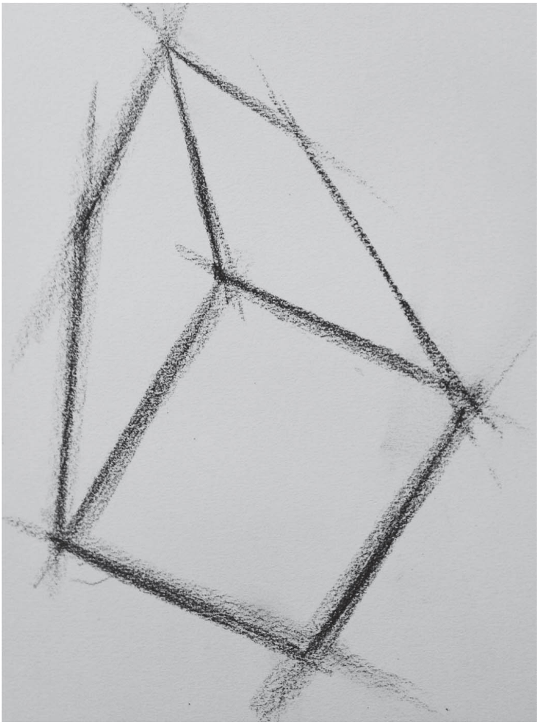


Fig. 51 Note the way the lines in this drawing overshoot each other slightly. Drawing this way helps to maintain a confident gestural stroke.

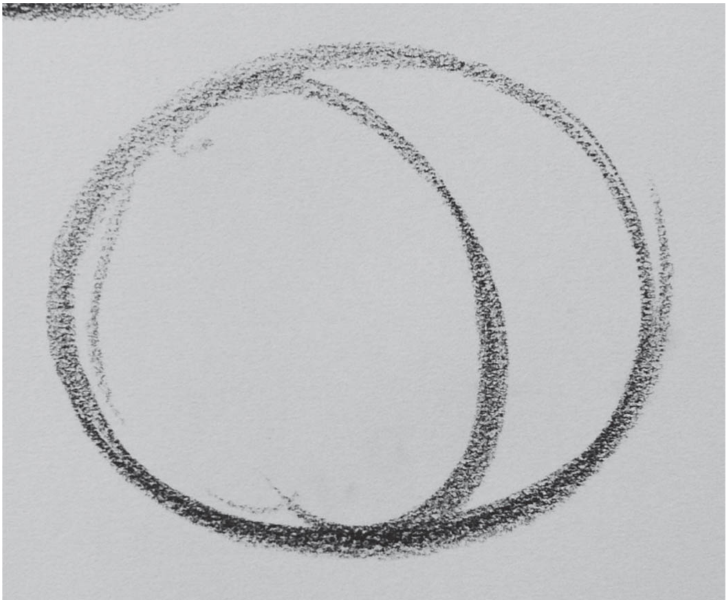


Fig. 52 This image of an egg form with contour line shows a variation in the line quality. Lighter at the top and darker at the bottom, this implies both a light source as well as a sense of weight.

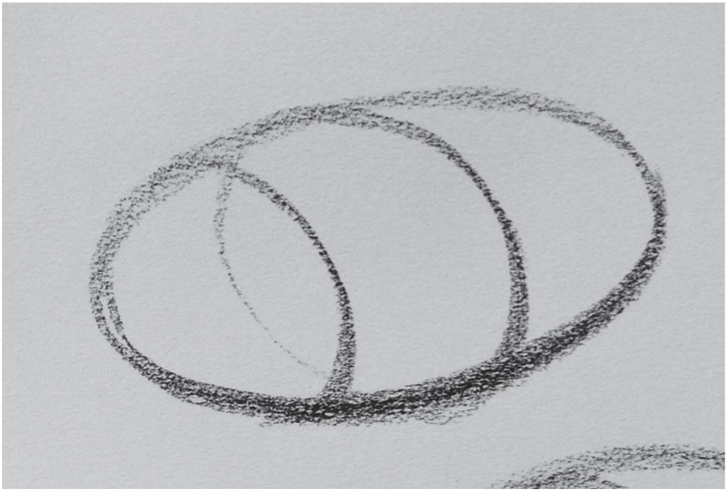


Fig. 53 Repetition of egg form with contour – draw these again and again until you start to get a feel for the form. We need to almost believe that the entities we are drawing are physically real.

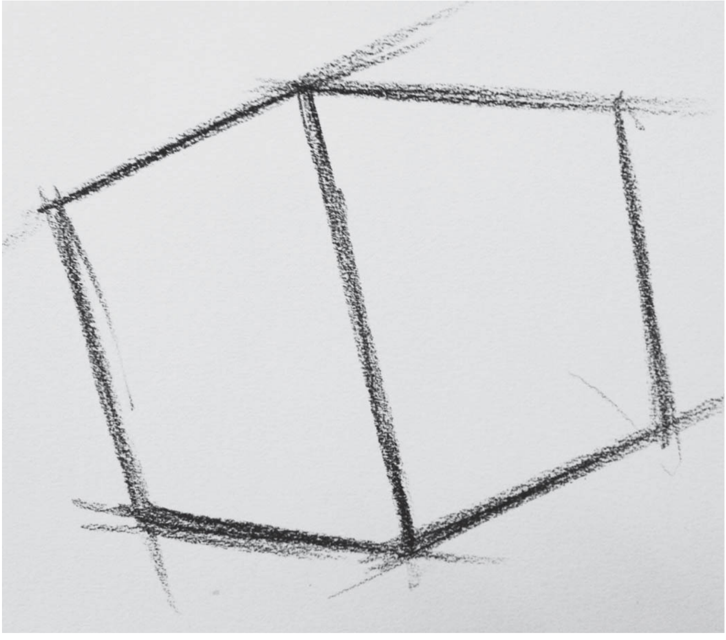


Fig. 54 Another simple box form – refer back to the exercises on perspective to

understand the slight convergence of lines as planes move away from us.

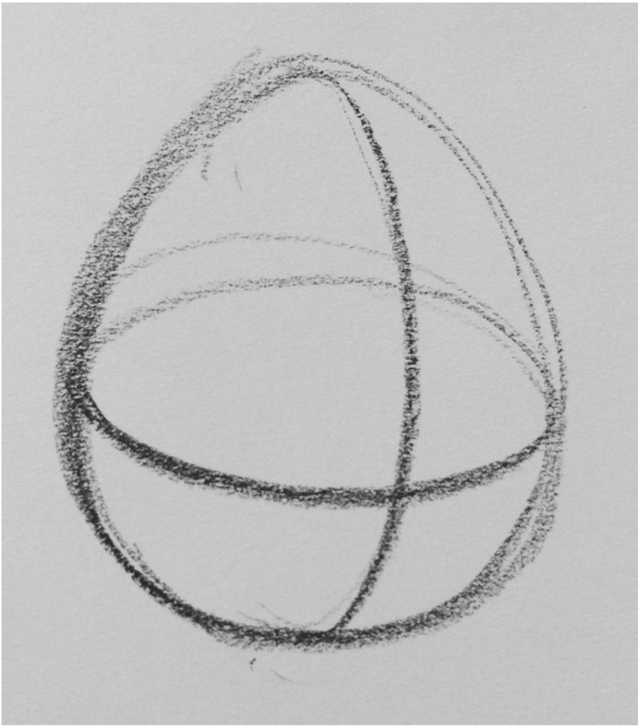


Fig. 55 This egg form tapers more towards the top, in the same way as a real egg. Start to vary the forms you draw in ways like this in order to stretch your capacity to visualize.

Drawing Technique

One thing that is very important with this exercise is to work on developing a fairly rapid, loose and confident line. You should aim to draw by moving your arm as a whole, and not only your wrist or your fingers, as when writing.

Distorting, Transforming and Combining Basic Forms

The next step is to practise distorting, transforming and combining these basic forms. The following illustrations show a number of scenarios, based on the elements of the box, egg and cylinder forms. Here we begin to visualize these as being variously bent, stretched, compressed, twisted and so on. This is the sort of exercise that is very like those practised by animators, and some of their approaches are worth bearing in mind. One of the most elementary exercises in animation is that of animating a simple bouncing

ball. This example, because it is simplified, means that one has to place extra emphasis on the communicative power of drawing.

Fig. 56 After becoming familiar with basic forms, we can start to add gesture and distortion. Imagine a state or action: this form is almost 'startled'.

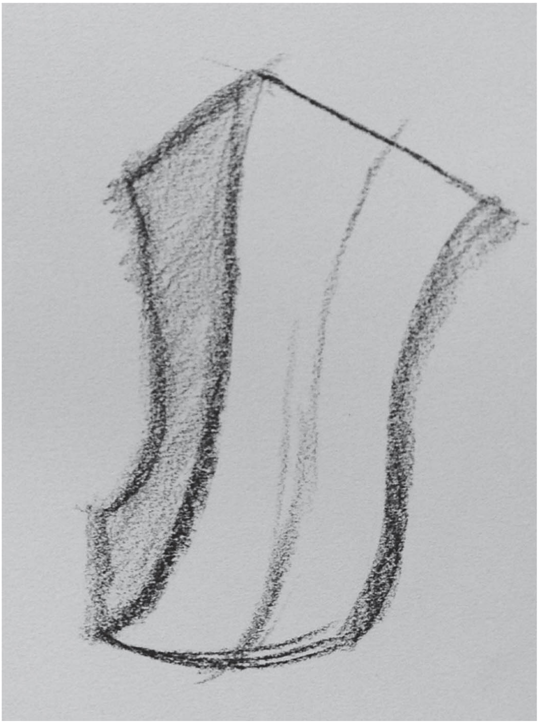


Fig. 57 Distorting box forms helps to more easily think about what happens with a stretch or a twist.

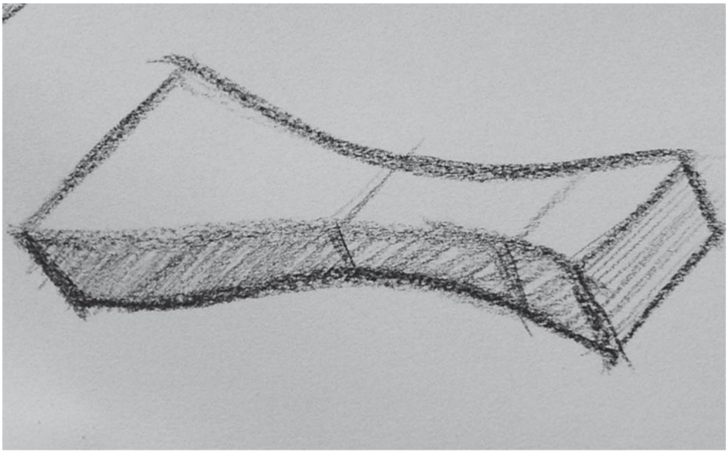


Fig. 58 Begin to imagine that the forms you are drawing are made from a flexible and pliable material.

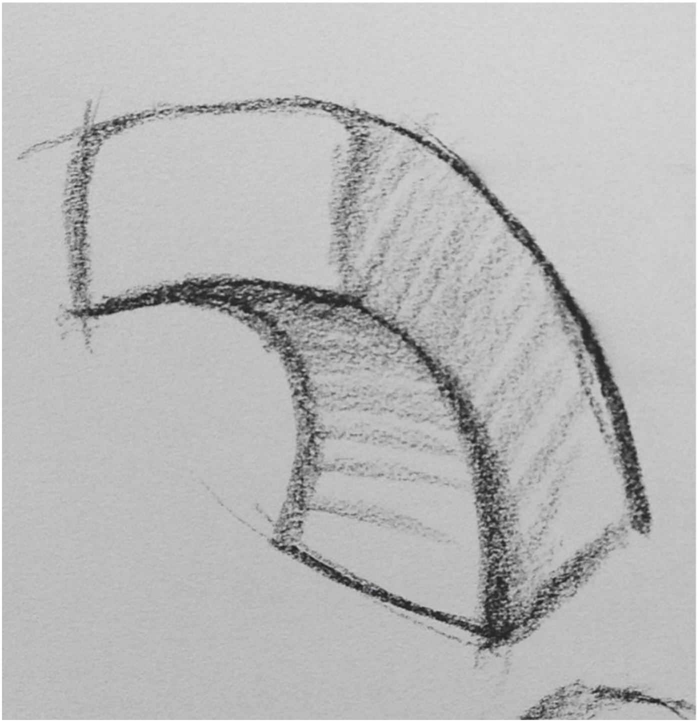


Fig. 59 Try to convey a sense of tension. Here, we still clearly have a box form, despite the fact that it is bending forwards.

Knowing when to stretch and exaggerate or emphasize in order to convey motion or impact is an extremely important factor. In fact, even very academic and highly finished life drawings can be helped by experience of such exaggeration, in that one becomes aware of the range of effects possible. After all, an effective representational drawing is as much to do with what is left out, as what is put in, and we have to be aware of the range of possible effects our drawing might create, perhaps especially those that we do not intend.

To this end it is worth exploring more exaggerated sorts of compression and distortion, as in Figs 60 and 61. Try to imbue these forms you are visualizing with dynamism, energy and character. There is a sense of this pliable dynamism in the most statuesque drawing by Michelangelo, for instance.

In addition to stretching and twisting our basic forms, we also need to start visualizing how forms might interact with one another. Try drawing two forms pressed against one another, wrapped around one another, joined together or pulling away from one another as in Fig. 62. This leads us on to the idea of compound forms.

Fig. 60 As you develop, start to introduce more organic qualities into your forms. Here, we have a slumping, bulging form.

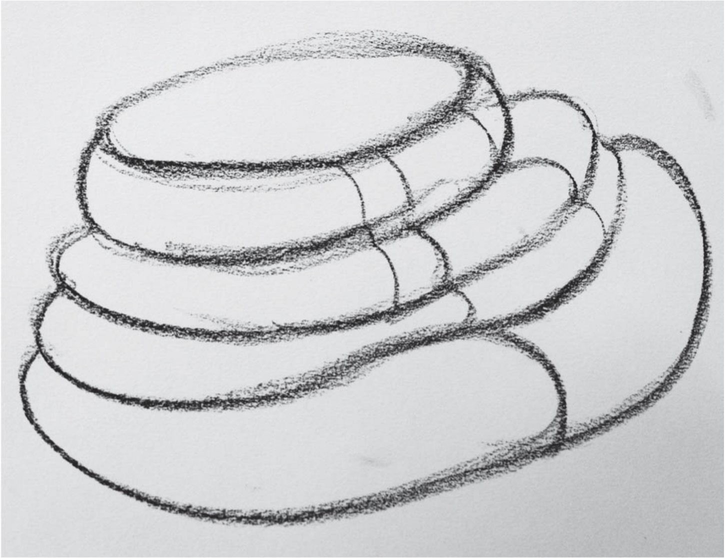


Fig. 61 Try more dramatic 'operations' on your basic forms. This form appears to have been severely compressed.

Visualizing Techniques with Plasticine

You may want to obtain some plasticine or a kneadable eraser, or some other soft form, to help you visualize techniques such as creasing, pinching and twisting. However, always be sure to then attempt visualizing these entirely from memory in order to test what you have absorbed.

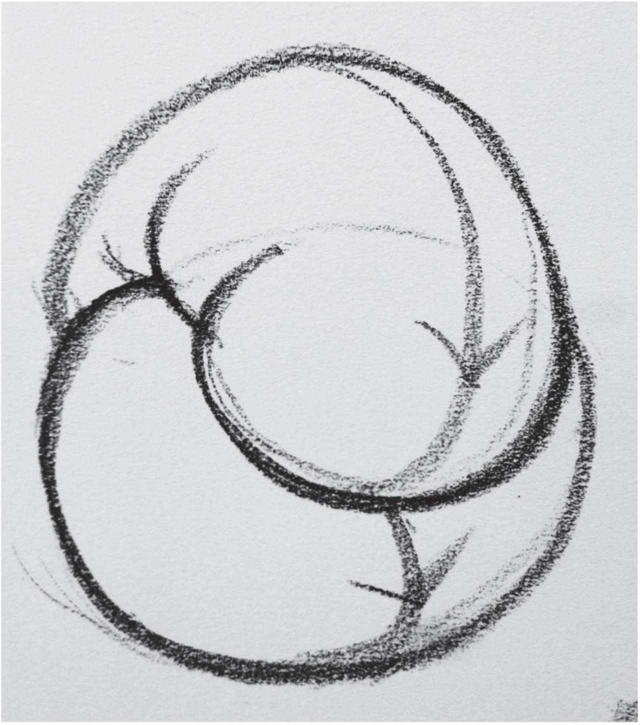


Fig. 62 Visualizing two forms in contact.

Compound Forms

The idea of compound forms allows us to start thinking about more organic objects that don't have a stable or necessarily clear geometric identity. When we are drawing the body, of course we are not dealing with perfect boxes, spheres or cylinders. The anatomical morphology of the body creates a continuous, organic surface which stretches, compresses, twists and so on. Geometric forms such as those we have looked at so far are ideas and tools to help us 'read' what we are seeing when working from the model, or to help us structure our forms when working from memory and imagination.

To begin with, it is helpful to notice again how many of the forms in the example drawings are given an extra 'bounce' or twist. This sense of pliable material is an important one to develop at this stage as these form

conceptions are very much analogous to a sculptor's material. If we are too rigid in our form conceptions they become difficult to work with, in the manner of a rigid unworkable substance. This is in fact a difficulty in developing these skills of visualization: often when we begin to experiment with this, we tend to overrstate geometric forms, creating a literal or inflexible conceptual element. But with practice, this difficulty breaks down.

Another Value

These exercises have another value in that they make explicit the conceptual workings of this sort of representational drawing, the effects of which can often be taken too literally, as in the notion that we are somehow 'copying' what we see. Emphasizing the ideas of analysis, construction and interpretation points up the fact that there are as many ways of doing this as there are artists.

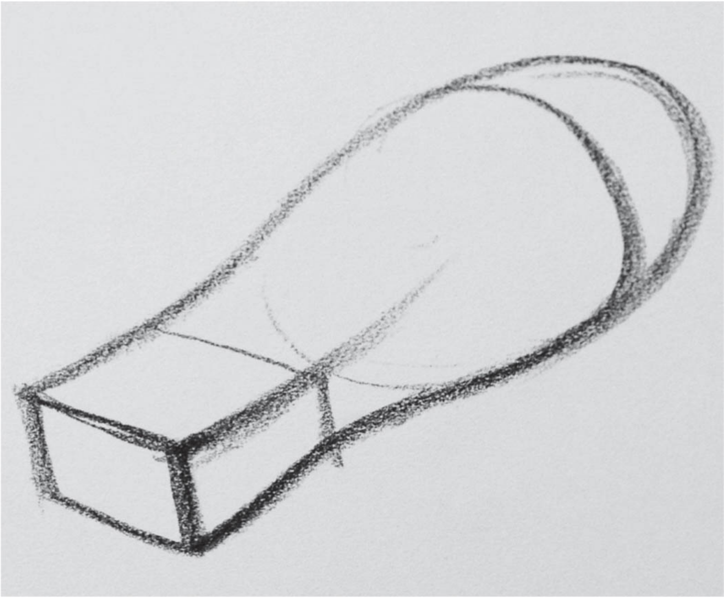


Fig. 63 This image shows a compound form, a kind of egg/box. Observe the contours indicating the cross sections at each end.

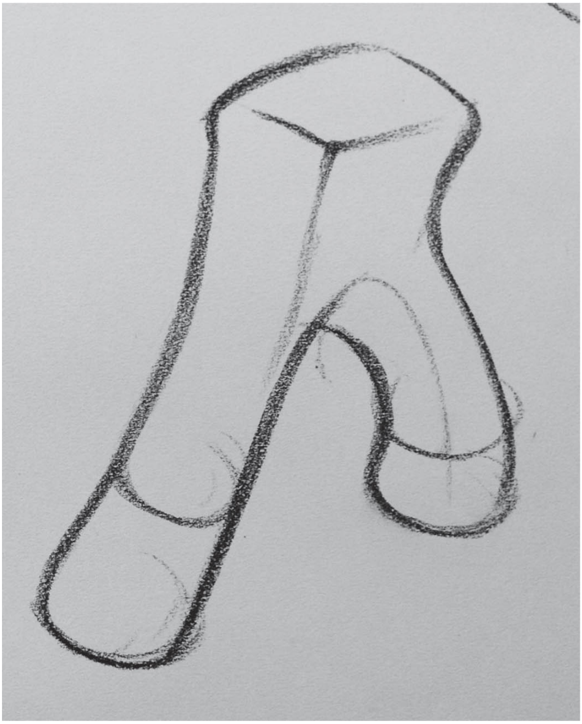


Fig. 64 Compound shape drawn with gesture and character.

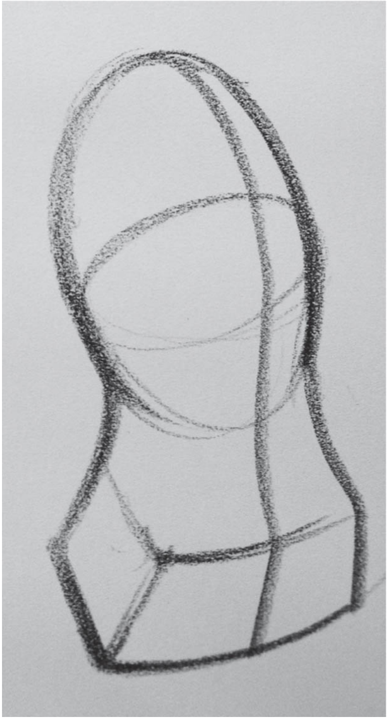


Fig. 65 When visualizing compound forms, be aware of the nature of the transition from one to the other. You might think of two forms covered by fabric in order to do this.

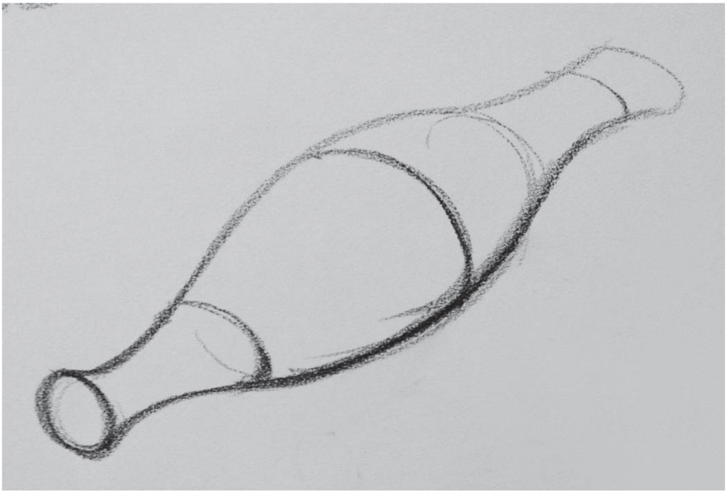


Fig. 66 Compound form analogous to the 'belly' of a muscle.

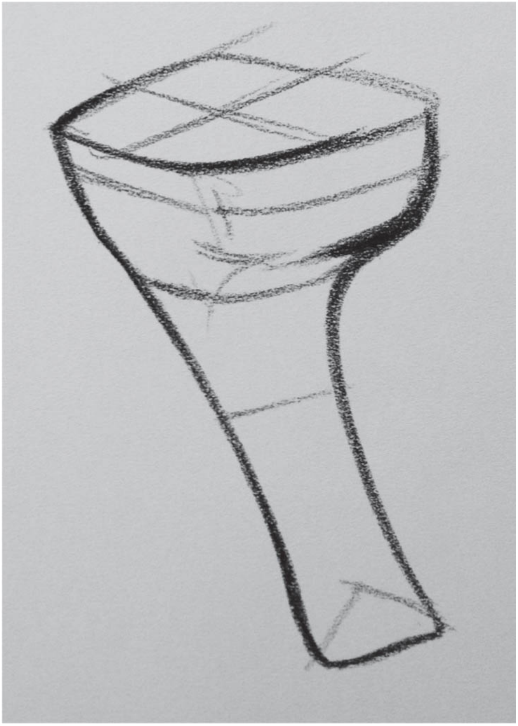


Fig. 67 Compound form analogous to the platform of the tibia.

To begin working with compound forms, a good beginning example is the idea of a cylindrical or egg-like form transitioning or blending into a box form. This is the kind of compound form that will serve you very well when drawing the form of the thigh as it moves into the form of the knee, for instance; or the form of the forearm as it transitions to the box-like form of the wrist. Fig. 64 shows a box form dividing into two cylinders, Fig. 65 an egg into a box, and Fig. 66 shows an egg form with tapered ends. This last form resembles the character of a muscle such as the bicep. Figs 65 and 66 are analogous to the pelvic area and upper thighs and the rib cage and pelvic area respectively. Fig. 67 shows an example which can be related to the proximal end of the tibia, the bone of the shin.

We can also at this point introduce some new useful form conceptions. The box, egg/sphere and cylinder can be thought of as our most basic units – in 3D computer-modelling software such forms are in fact referred to as ‘primitives’. But now we are familiar with these, we can look at what we might think of as secondary or modified forms. There are two in particular that are useful to us: the prism and the spool.

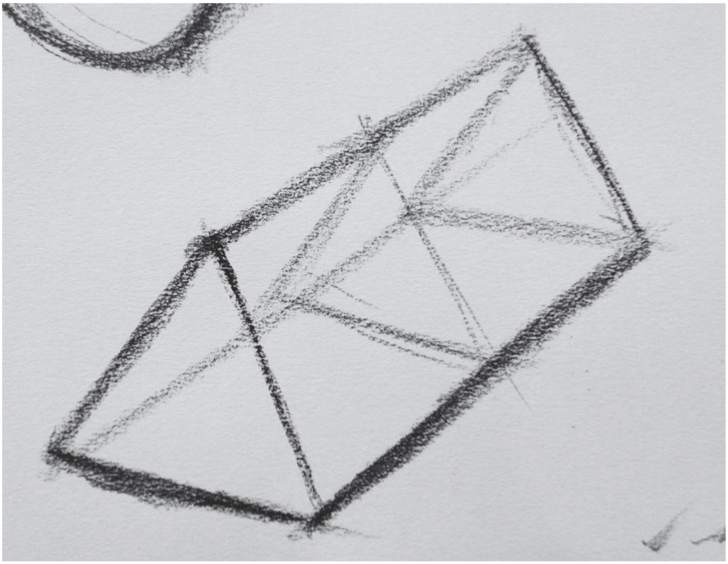


Fig. 68 Triangular prism.

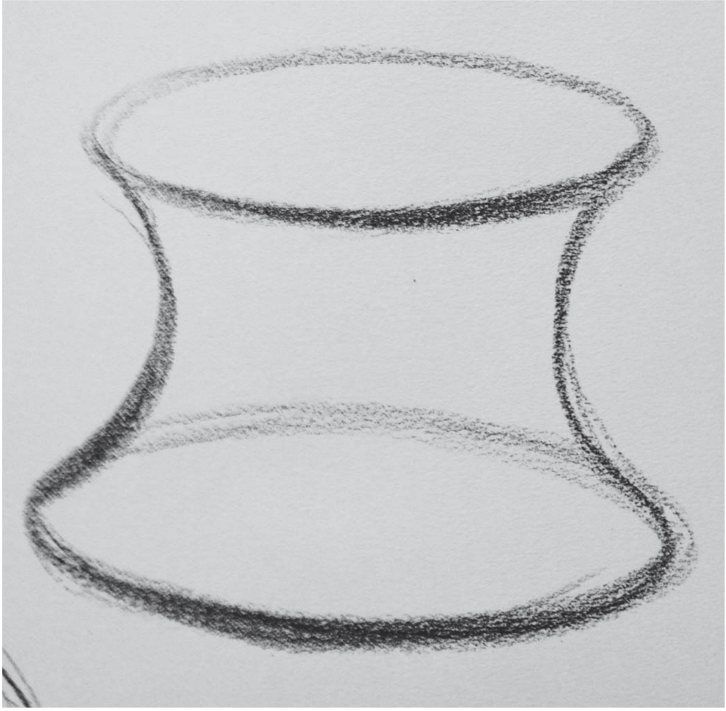


Fig. 69 Spool form.

Our cylinder can be redescribed as a circular prism. Here it is helpful to think about what is happening with a prism form, and we can break this down into two ideas: the cross-section, and the path along which this section runs. A cylinder, then, consists of a circular cross-section running along a straight path. If we change the cross-section, we get a different form. A triangular cross-section gives us a triangular prism, a hexagon a hexagonal prism, and so on. This idea is very important for thinking about long forms, and further on we will see that this is a very useful way of understanding the long bones of the skeleton. The spool is another useful form, and can be thought of as something like a cotton-reel. Its combination of concavity and convexity will be discussed below.

More Form Relationships: Overlapping and Foreshortening

A final point about relationships between forms is to do with how we can express their spatial relationship to our point of view. Foreshortening, for instance, is a famously difficult drawing problem to deal with. It can’t be denied that the successful handling of this depends on many things, and many different skills. Particularly crucial is a well developed feeling for pictorial depth, and this is something that takes time to acquire. However, foreshortening is really an opportunity to further examine the mechanics of what we are doing, and it is possible to explain it to ourselves with some quite simple exercises.

For this we will return to our basic sphere/egg form. For this exercise we can lightly sketch out two sphere forms, overlapping slightly. It is important to keep your lines very light at this point, as here we are only thinking about basic placement. We now have a decision to make: which sphere will be in front, and which one behind. In the simplest scenario we shall decide that the lower sphere is in front and so we will complete its contour line. All that remains is to indicate the visible portion of the sphere that is behind.

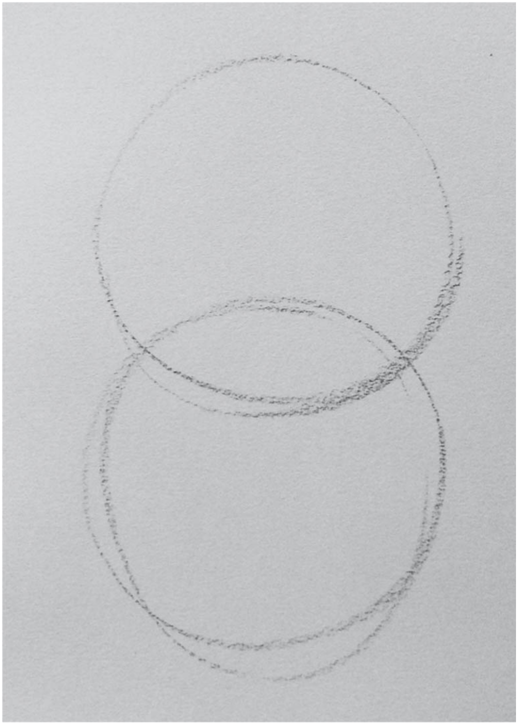


Fig. 70 Lightly sketching in some basic overlapping forms.

Try it the other way. Be sure to vary your line quality – a solid contour line would convey a basic graphic overlapping. This might be adequate in some cases, but it would not communicate space or atmosphere. It would also read as a simplistic 'outline', and we have seen that what we really want to work with is the idea of the contour line. Thinking this way gives us more options to communicate the overlapping of these forms, for instance such as stressing the contour of the foreground form where it crosses the rear form.

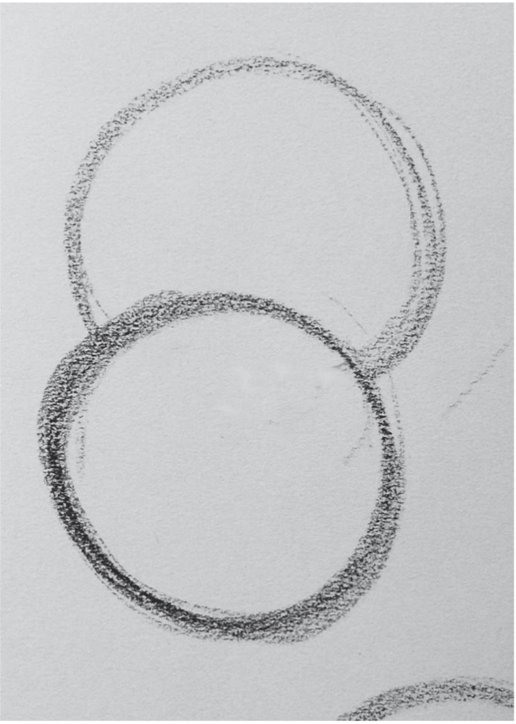


Fig. 71 Paying attention to line quality, a basic sense of depth is achieved.

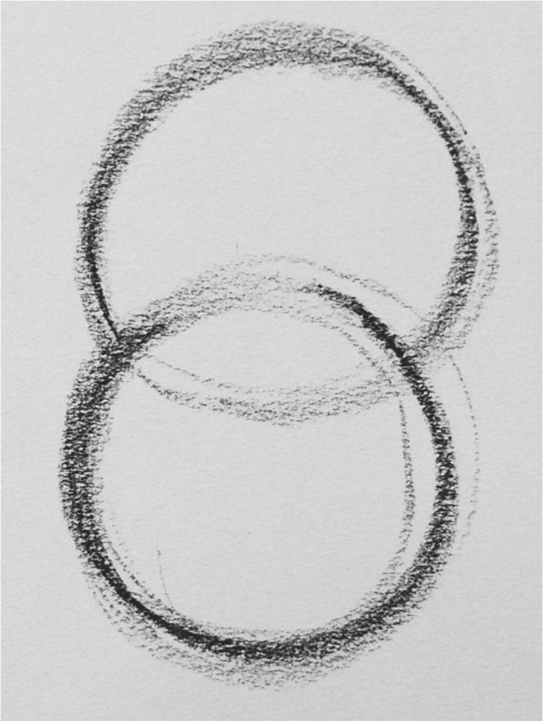


Fig. 72 By leaving some contours incomplete, the forms appear fused.

In the next example we will do the same thing, but will consider the spheres to be fused together. Imagine two rubber spheres glued to one another, or perhaps melted and slightly merged together so that they are attached whilst retaining their distinctive identities. Once again we will decide to position the lower sphere in front. This time though, instead of fully closing its contour, we fade it out just after the overlap with the rear form. The remaining visible contour of the rear form is then closed. Again try this the other way. By deciding that the left portion of the front sphere is in front and the right portion behind, we can give the impression of a twist. We can also experiment with creating a chain of receding forms created in this way. A rudimentary but effective communication of foreshortened forms can thus be conveyed with line alone.

Fig. 73 Varying the overlap gives the sense of a twist.

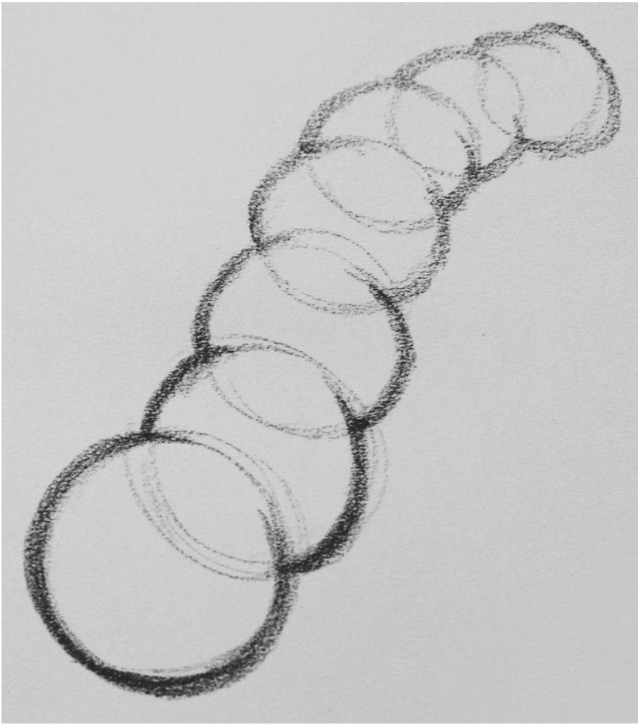


Fig. 74 A receding chain of basic forms illustrating how foreshortening can be conveyed using only line. Note also the way that the line quality is darker and heavier nearer to us, fainter and lighter in the distance.

Understanding Complex Planes

Segments of basic forms can be used as a way of understanding complex planes. As has been suggested, there are many times when what we want to draw can't be summed up as, or be reduced to, a straightforward egg, cylinder or box. It is very often the case that we are presented with a combination of these, or perhaps even a segment of one of them. The spool form introduced previously is a good example of how a basic form can help us to understand a very complex plane. If asked, it might be a real struggle to try to express a plane that is simultaneously concave and convex. However, if we take a section from the surface of a spool, this is exactly what we get.

Fig. 75 shows a rectangular plane mapped on to the surface of the spool that is convex vertically and concave horizontally. This is another conceptual strategy to help develop our sensitivity to form. It can be applied from macro to micro – after all, the light reflected from a window which presents itself as a highlight in an eye is really just a rectangular section mapped on to the spherical surface of the eyeball.

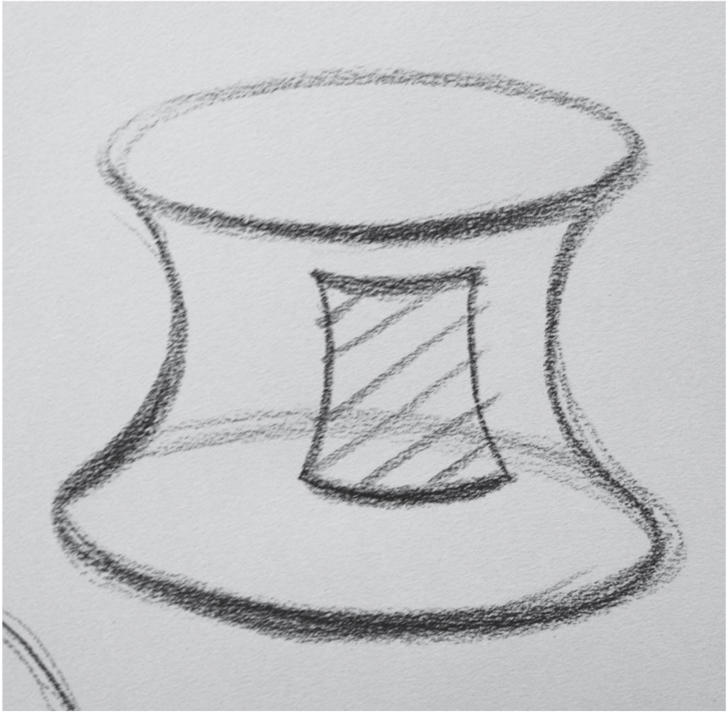


Fig. 75 Rectangle mapped onto surface of a spool to express a plane simultaneously concave and convex.

'Operations' on Forms, Segments and Planes

To be able to see and conceptualize the subtle morphology of the body we need our experience in visualizing compound forms, and our experiments at transforming them. There is a further dimension to this, which will deepen our understanding of the contour line and the notion of the terrain of a form; this in turn will give us a firm foundation for dealing with light and shadow.

The following examples imagine a cutting operation performed on a basic form. A truncated cone is the simplest example. In addition to our external contour line, we now have an interior contour line, describing the flat plane that has been left by the 'cut'. The word 'cut' is in inverted commas because of course nothing has really been cut – but in fact it is important to start cultivating a kind of 'belief' in the reality of the forms we are working with, that they are somehow already there and that we are drawing over their surfaces.

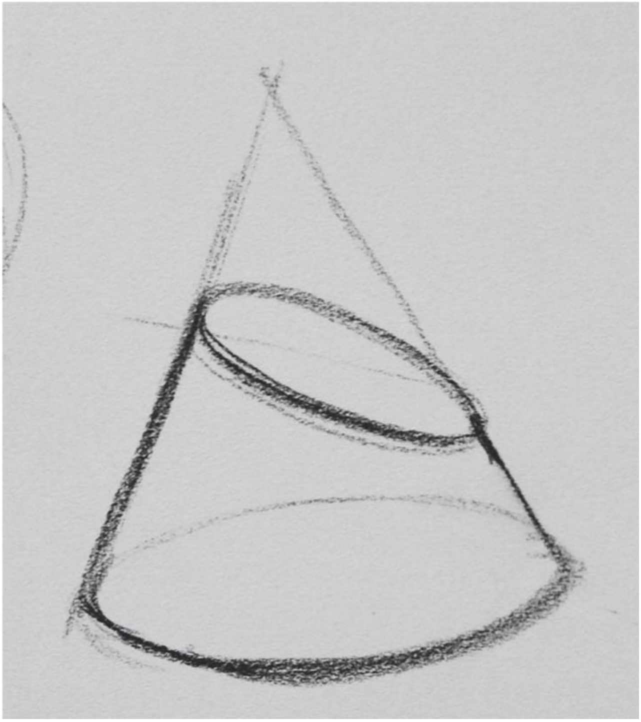


Fig. 76 Visualize complex planes by imagining a cutting operation on a geometric primitive, in this case a sliced cone.

We can also see these examples of how a basic egg form can be sliced in different ways: Figs 77 and 78 show two examples, but also illustrate the orientation of the cut expressed as a plane, which can be thought of as the angle in space of the ‘blade’. We also have an example of two geometric solids interpenetrating. The internal line that describes the meeting point of the curved and flat planes is another example of a contour traversing the surface of the form. The part of a shadow that is in between direct light and reflected light, known as the core shadow, does exactly this, as we shall see.

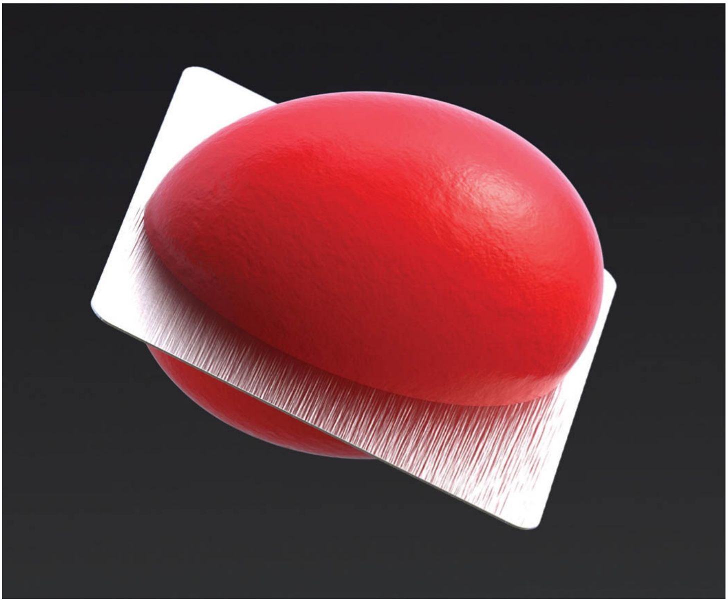


Fig. 77 Angle of 'cut' as analogous to shadow line and light direction.

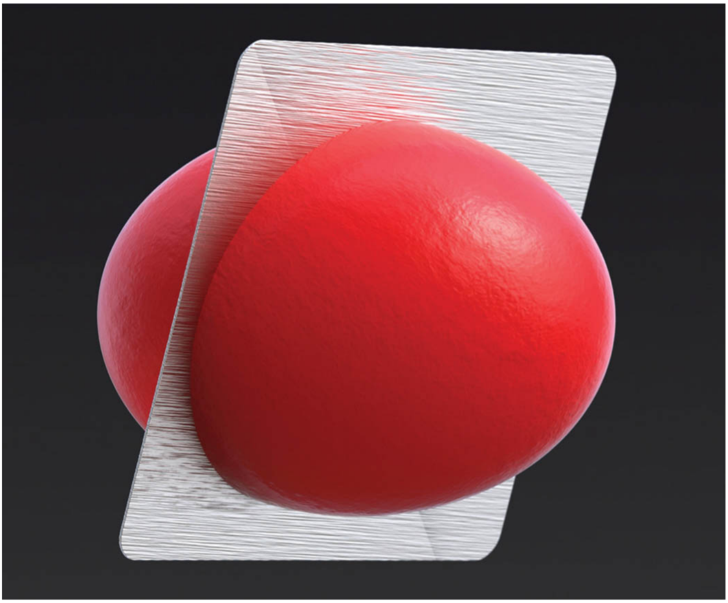


Fig. 78 Angle of 'cut' as analogous to shadow line and light direction.

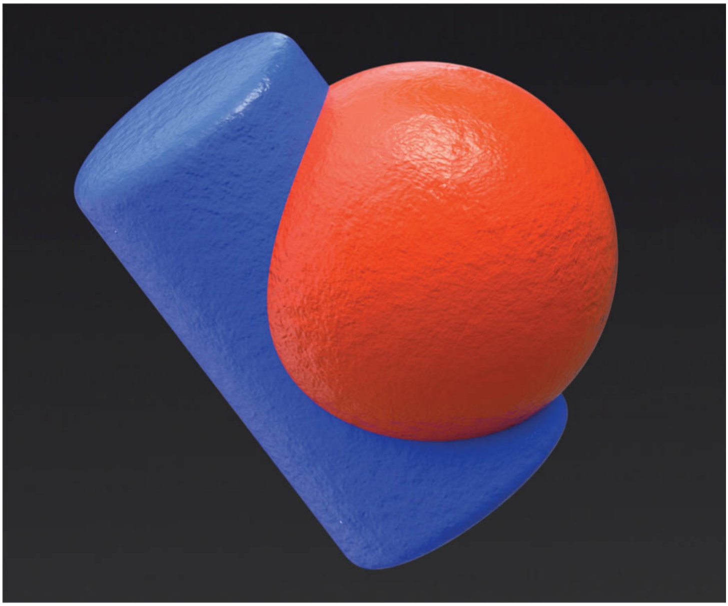


Fig. 79 This image shows a pair of interpenetrating forms – the body is full of interlocking volumes.

Introduction to Light and Shadow

The treatment of light and shadow in drawing, and how these contribute to the expression of form, is an immensely complex area: this section provides a rudimentary way in.

Direct Light

The most common lighting scenario in life drawing, and also perhaps the most effective way of creating a naturalistic illusion, is the use of direct light from a single source. The simplest distinction we can initially make is between light, shadow and reflected light. A more nuanced distinction would be as follows:

- Highlight
- Light
- Half-tone
- Core shadow
- Reflected light

The key idea that we will examine first is that of the core shadow: this can be thought of as the part of a form which is between the light and the reflected light. Light rays strike some parts of a form directly, and pass by

others at a tangent. Light rays that pass the form can be reflected back by the surrounding environment and strike the other side of the surface – it is helpful to think of how a portrait photographer will use one direct light source, plus a reflective material on the opposite side of the sitter which acts as a ‘fill light’.

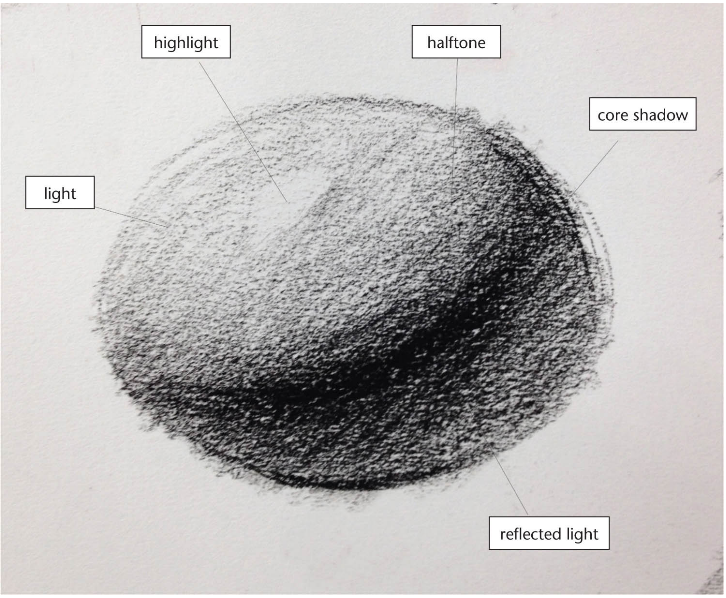


Fig. 80 Five basic categories of light and shade.

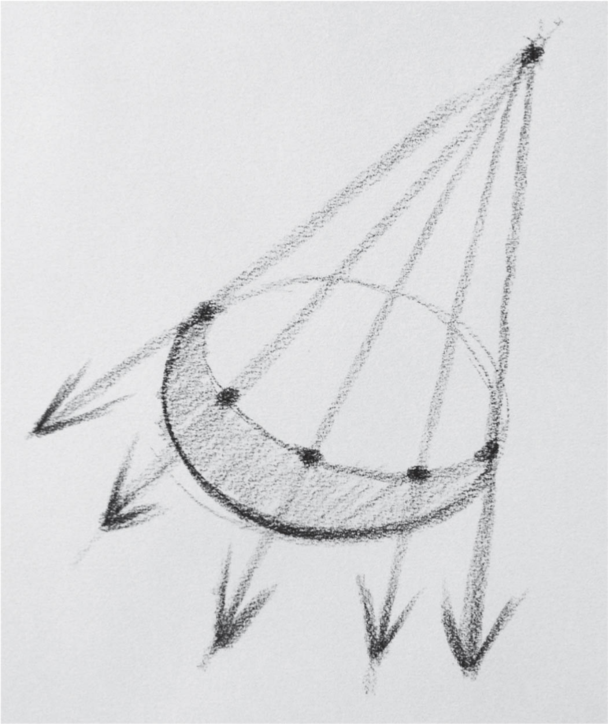


Fig. 81 Light rays and shadow line.

The illustration demonstrates again the path of light rays striking a simple egg volume. The core shadow is the part of the form that receives the least light, and runs across the terrain of the form perpendicular to the direction of the light rays. Think back to the examples of 'sliced' forms earlier in this chapter to see how the core shadow runs along a contour similar to that describing the 'cutting' angle in those images. The angle of the 'blade' is analogous to the angle of the light source here, and should give you an idea of how the core shadow can vary according to the direction of the light source.

We will look more at the idea of a core shadow as the book progresses, but here note that it is not a sharp edge. Sharp edges are to be found at sudden changes of plane, or at the origins of cast shadows. The degree of tonal transition is related to how 'quickly' or 'slowly' a form turns away from the light. See Fig. 82 for an example illustrating this.

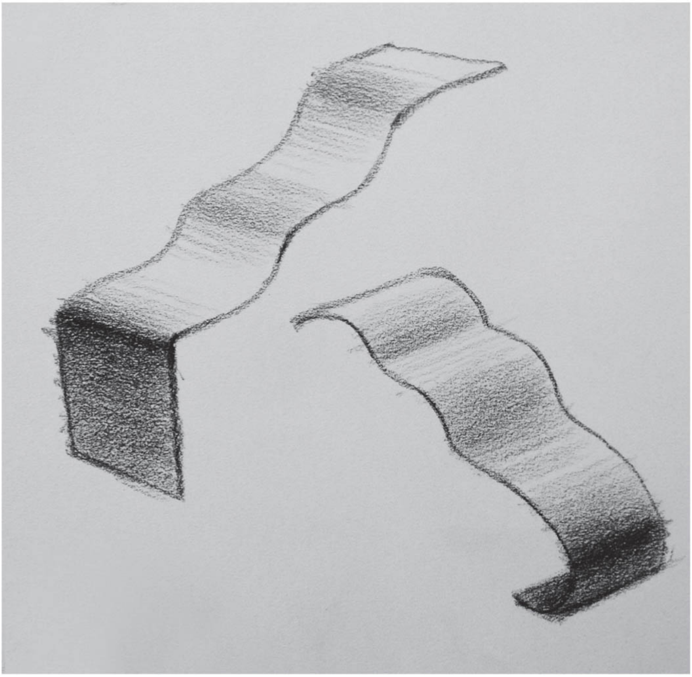


Fig. 82 Tone varies with the rate that forms turn away from the light.

Cast Shadows

What we have been dealing with up to this point can be thought of as the form light. The form light appears stable as we move around an object in a way that highlights, for instance, do not (think, for example, of how a jewel glistens as we move around it).

Another factor we have to take into account are cast shadows. Cast shadows appear when one form directly blocks the passage of light to another form – see the egg form (Fig. 80) for the simplest instance, where a shadow is cast on to the ground plane. Note also how the cast shadow serves to ‘contain’ the volume of the egg form, and to increase the sense of luminosity of the reflected light.

Fig. 83 Cast shadows visually bound or contain the reflected light and accentuate the luminosity of shadows.

If the reflected light is kept too bright, a kind of metallic effect can result, which is not usually what we want when drawing from life. Note that these examples are to illustrate a principle – you should aim to experiment with them and see for yourself the variety of effects that can be achieved. Also bear in mind that this is not simply how light works in general, but a description of quite a controlled situation. Multiple light sources and surfaces can create a bewildering range of effects; however, the conditions described here are the ones most often seen in representational drawing and painting, and have been the basis of most academic training.

Atmospheric Perspective

Another tool we have at our disposal is the idea of atmospheric perspective. This simply refers to the phenomenon by which forms that are further away from us appear to tend towards the neutral in colour, the mid-tone in value, and the indistinct in contour. Often mentioned in connection with landscape painting, the clearest example is to be found in observing distant mountains, which become paler as they recede from us.

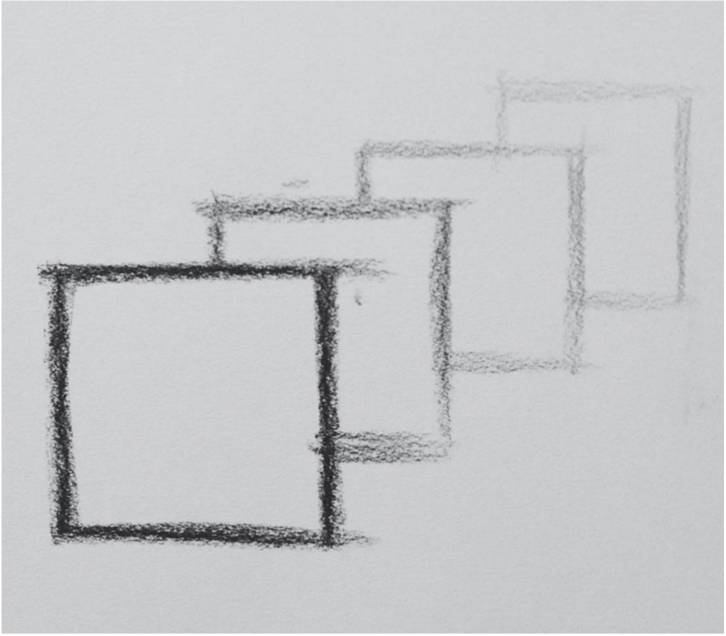


Fig. 84 Atmospheric perspective and recession.

The example in Fig. 84 illustrates this simply, with a series of planes receding in space and their consequent tending towards neutrality: dark forms become lighter, and light forms become darker until they would theoretically meet in the middle. Think of the effects of atmospheric perspective as being an adjustment of contrast: high contrast in the foreground, low contrast in the background. This is another effect that we can use to explain form, and is akin to conveying a sense of the air between us and the figure.

Basic Forms and the Human Skeleton

We now have a broad set of conceptual tools with which to work, and to practise continuously. We can now start on applying these to the forms of the body. In developing an understanding of the anatomical forms of the body, we need to integrate anatomical information with the principles of drawing, and demonstrate these forms to ourselves by those means. As has been said, we are not so much looking at anatomy and perspective as anatomy *in* perspective, in space.

The final section of this chapter will provide you with an example of how we might approach a study of the skeleton. Understanding the skeleton is key in the study of drawing the anatomical figure. This is for several reasons, all of which are worth discussing. The first is perhaps simply that the skeleton is the elementary structural frame of the body, and that thinking of form in this way, from fundamentals to surface incident, is the closest we

come to a hard and fast rule in this account. This would tally with how we will approach the work of rendering light and shade, moving from the general to the specific.

Another reason for focusing on the skeleton is that, although the individual muscles do have particular characters, in the end their form is determined by their being fixed to the rigid frame of the skeleton. Muscles have a point of origin and a point of insertion, and so in a sense can be thought of as somewhat shapeless but for this relationship to the bony frame.

Yet another compelling reason for a study of the skeleton is that its proportions are much less variable from person to person than are the structures of muscle and fatty tissue. In addition to this, those parts of the skeleton that are present just under the skin – the forehead, the bones of the hands and feet, the shoulder points, the pelvic points, the pit of the neck and so on – are so regardless of particular physique. Such points may be visible as protrusions on a very lean body, or as dimples on a body with more fat, but they are consistently visible landmarks nonetheless. The skeleton is therefore a relatively fixed structure that we can learn to see and understand in perspective.

The problem with the study of anatomy, however, is often one of working out how to digest the vast amount of information in a way that is useful in terms of drawing. If you have ever spent time copying anatomical diagrams only to feel none the wiser in front of a model, then you may already know this. There is also the oft-mentioned example of the surgeon who has an encyclopaedic anatomical knowledge but who cannot necessarily draw the figure. Again, this knowledge has to be pushed through the right filters. In this case we will apply the vocabulary of basic forms that we have just developed to the collar bone, or clavicle.

A final note – it may be possible for you to gain a fair idea of skeletal structure from accounts such as this, but the only real way to get a grasp of it, which is truly your own, is to study the bones themselves. High quality casts of these are available relatively inexpensively and can be bought piece by piece. What follows is a suggested method for their study.

Example: The Clavicle

We can now use the conceptual tools we have developed to create a clavicle in 3-D space. The clavicle is simply the anatomical name for the collar-bone. I will tend to emphasize the accepted conventional names for the skeleton, for two reasons: first, the names are very logical and descriptive, and second, they are used by all anatomical resources. This means that you will be able to relate information in this book to information you find elsewhere.

To create our clavicle we need to think about its various crosssections, and the path that these sections take through space. The clavicle can be thought of as a triangular prism transitioning into a cylinder, then into a flattened box form. These crosssections run along an elegant S-curve. Using the drawing tools and vocabulary we have developed so far, we can visualize such a form from any angle, and even start to light and model it differently. This obviously gives a hint as to what we could accomplish with more

information.

This way of studying the skeleton is very valuable because it gives a sense of the skeletal structure as a three-dimensional framework. Practise visualizing this form, using anatomical reference to reinforce your work. If you can, get yourself a full size model skeleton to work with: this is the best possible way.

There are also many kinds of software available that allow you to view and rotate a computer model of a skeleton in threedimensional space. These can be excellent resources. All the information in the book thus far is our foundation – we now have the tools with which to begin analysing the forms of the body in some more detail.

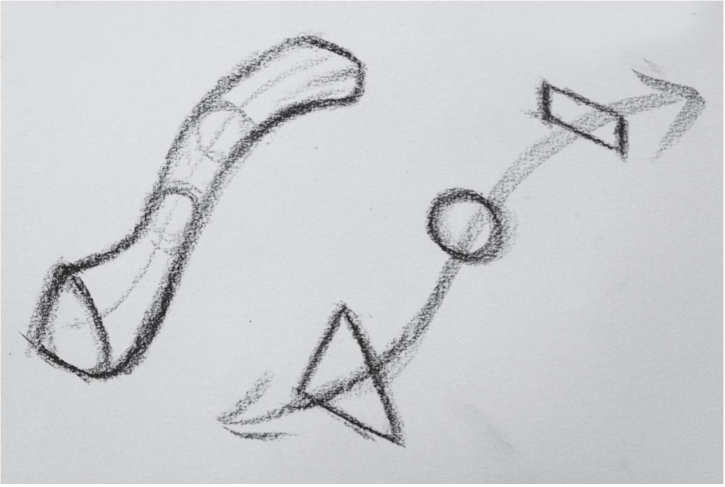


Fig. 85 Analysis of clavicle cross sections.

PART 2

ANATOMY

CHAPTER 4

ANATOMY FOUNDATION

Gesture Drawing

Before we move on to looking at human anatomy, we need to look briefly at the issue of gesture drawing. We have practised visualizing form in various ways, but this leaves the question of how forms are to be organized in relation to one another. Fig. 74 showed a chain of spheres receding into pictorial space. If you imagine this image as representing something like a string of pearls, we could say that the pearls are the forms and the string is the gesture: the curved axis along which the spheres are arranged. Similarly, the forms of the body can be thought of as having gesture, or an overall rhythm and direction.

Fig. 86 With gesture drawings, aim for a sense of fluidity and motion.

The first images in this chapter show some examples of how we can develop a basic notation for this. In drawing the body, the single most important thing is to capture a sense of the total. What this means is that no matter how carefully detail or local incident is rendered, a representational drawing of the figure will not succeed if those elements are not held together in some broader way. A sense of primary structure is one of the things that is meant by the gesture of the figure; another is the idea of action. A reclining body obviously has a different set of visual and structural dynamics than a body undergoing exertion or pressure, and so these factors are what are needed to govern the observation of detail.

The following set of exercises offers a way of analysing this idea visually, and suggests some ways of beginning to think about gesture. There are many approaches to doing this, so use what is here as a starting point. For these gesture exercises, we will think in terms of short drawings that analyse the flow of movement through the body. Consider the aim to be something like achieving the most economical statement possible about the posture and body language of the figure you are drawing. This exercise is an excellent way to use very short poses when working with a live model; it can also usefully be done from photo reference and the work of other artists. In much the same way that the composition of a painting will have a series of flows and dynamics, so will a body, or a building, or any structure that we might

focus on.

Although these drawings are best done briefly and economically, they are not necessarily to be made at high speed. Aim to be deliberate and clear at the same time as being fluid, and allow your pencil or charcoal to explore the surface of the paper as you create what can be imagined as a kind of diagram of the forces and tensions in the body. This takes time and practice to achieve.

Fig. 87 Balance is an important factor: in a standing pose the weight bearing foot is usually vertically in line with the head.

To further make clear the function of a gesture drawing, an example can be given of a scenario where you might be asked to make a drawing of a figure in one line – thus a standing figure would be a vertical line, a body with a contraposto twist might be an S-curve, a reclining figure a horizontal line, and so on. If the body is a long story, then a gesture drawing is intended to cut it short, and give the basic facts.

Again, this exercise is highly important for many types of application. For animators, the sense of movement and action is paramount, but this is also true even for those situations where a monumental or extremely static and highly rendered form is what is sought: figure sculpture is the prime example here. In fact, the sense of movement and force is exactly what tends to fall away if a drawing or painting is worked on for a long time – the more you

practise this aspect of drawing, the more your awareness of it develops, and the less likely you are to lose it in more finished work.

Fig. 88 As well as more extreme movements, practise drawing the gesture of more subtle poses, where there is a slight shift of weight.

It is fine if your gesture drawing demonstrates this in a way that is quite abstract initially – in fact, it is important to avoid drawing the optical impression of shapes you see (though shapes have gesture, too – more on this later) or identifying too reductively whether something is an arm or a leg, for instance. This kind of gesture drawing is an example of a visual analysis of what we are looking at, rather than an optical rendering of the light and shade we see.

Throughout this book the predominant idea is that our drawings are meant to be equivalents for what we are seeing, and that they are a particular sort of information organized in such a way as to communicate. Though there will be more discussion of rendering light and shade in order to create the illusion of three-dimensional space, this will always be with a view to communicating form ahead of rendering atmosphere and texture – that is a whole other subject outside the scope of this book.

Gesture and Form

Once familiar with the idea of capturing the flow of movement in the body, we can start to experiment and augment such an approach with our vocabulary of basic forms. The distortion and combination of the basic forms of the egg, cylinder and box gives us a broad vocabulary, and we can start to suggest some of this in our gesture drawings. The key word here is 'suggest'. We can start to imply volume as well as flow, but it is important not to pin things down too tightly, so avoid closed volumes and shapes at this point. Imagine you are trying to carve out the space in which the figure can emerge. Though we are, of course, aiming for a kind of truth to the pose, the difficulty with gesture is that it has to be fluid, and so we are not talking about hard accuracy as such.

The other point to consider is that gesture also has a pragmatic function – that is, simply getting us started. It needs to contain information, but be flexible and subject to change. Approaches to exploring this are very individual. One thing to bear in mind is that once you have made a few more developed and finished figure drawings, you will have a better understanding of how gesture works and what it needs to be for you, through having lost it, found it, lost it again, and so on.

To sum up: what we have at this point is a refinement of our basic vocabulary, now more explicitly directed towards the human form. This will allow us to make more dynamic and complex statements, which are flexible enough to work with. These are also the tools that allow us to analyse and assimilate the key structures of the skeleton, our primary concern when approaching anatomy.

The Skeleton

Major Skeletal Forms

It should be emphasized that everything in this book is an attempt to demonstrate certain principles, and not a prescription as to what form they take. Many drawing books take these same principles and apply them in quite different ways, which is why it is best to consult as many as possible. No two are quite the same, and there is real insight to be found in the differences. So although there are no rules as such, the closest thing we have to one would be to say that, when handling complex information, we must always work from large to small, and from the general to the particular.

A book of this scope cannot cover all human anatomy in full detail, but it can offer a way of approaching this vast and fascinating subject. The principle of working from the general to the particular, for instance, teaches us how to approach the complexity of the skeleton. We can start to break it down into major forms, starting with the three largest: the rib cage, the pelvis and the skull. The relationship between these three forms gives us the core of the body: rib cage largest, pelvis second largest, and head smallest.

Fig. 89 Simplification of the major forms of the skull ribcage and pelvis as seen in profile.

Experiment with drawing these using egg volumes and exploring their orientations. Doubling the overall height of these three elements gives an indication of the total height of the figure, so you can see how a little anatomical awareness can quickly simplify proportional difficulties. Now we move into complexity, but we need to go through this in order to learn how to simplify more effectively.

The Rib Cage

Figs 90, 91 and 92 show a general view of the skeleton. Figs 93 to 97 show images detailing the critical skeletal landmarks that we need to know. We will start with the rib cage. This is our first example of how we might approach complexity. The rib cage is at first a bewildering structure consisting of twelve pairs of ribs, curving and twisting through space. This is only how it appears if we take it part by part, however: if taken as a whole, it is something more like an egg volume.

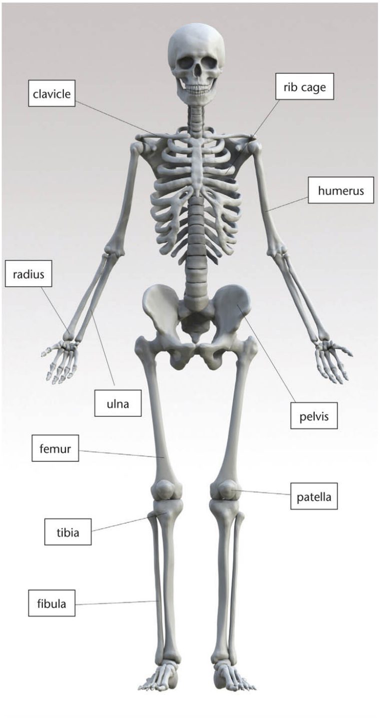


Fig. 90 General view of the skeleton from the front.

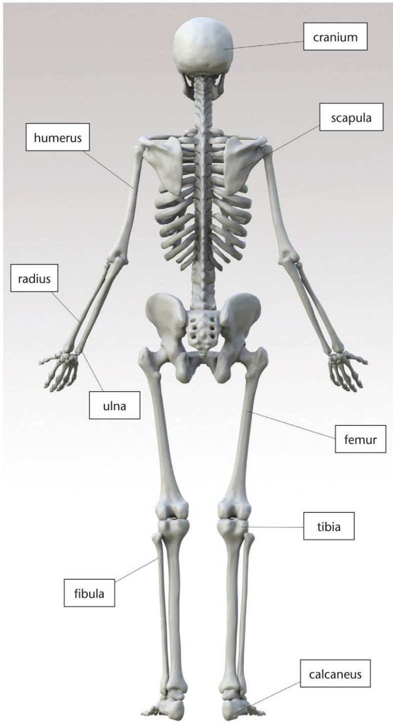


Fig. 91 General view of the skeleton from the back.

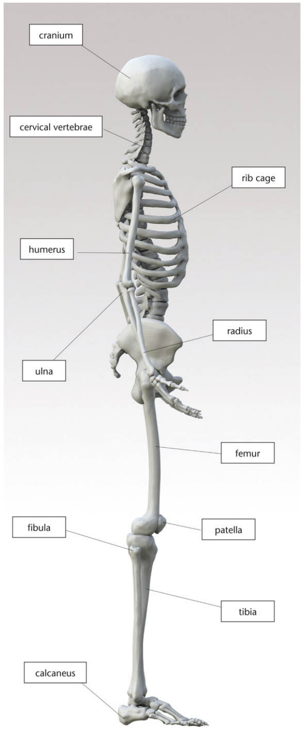


Fig. 92 General view of the skeleton from the side.

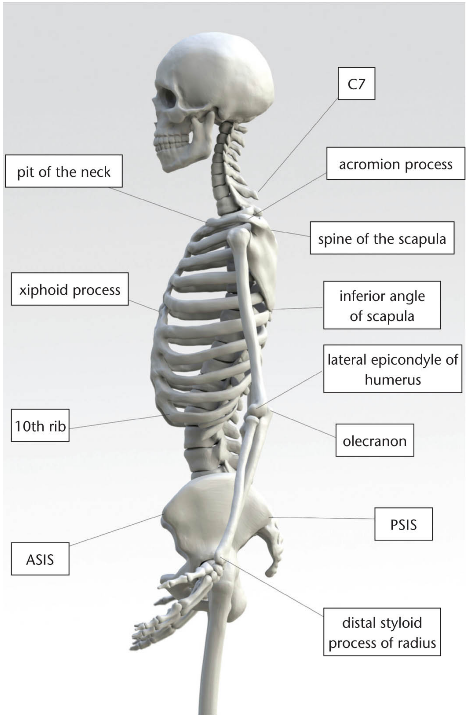


Fig. 93 Skeletal landmarks of the upper body seen from the side.

A good way of conceptualizing complex form is to ask how it might appear were it to be shrink-wrapped in a white fabric. We can refine this by saying it is like an egg volume that has been selectively planed. This will be the general principle: getting the basic idea, then refining it. That process of refinement is where detailed study comes in. This can only be pursued individually; what is offered here is a framework on which to build.

Fig. 94 Skeletal landmarks of the upper body seen from the front.

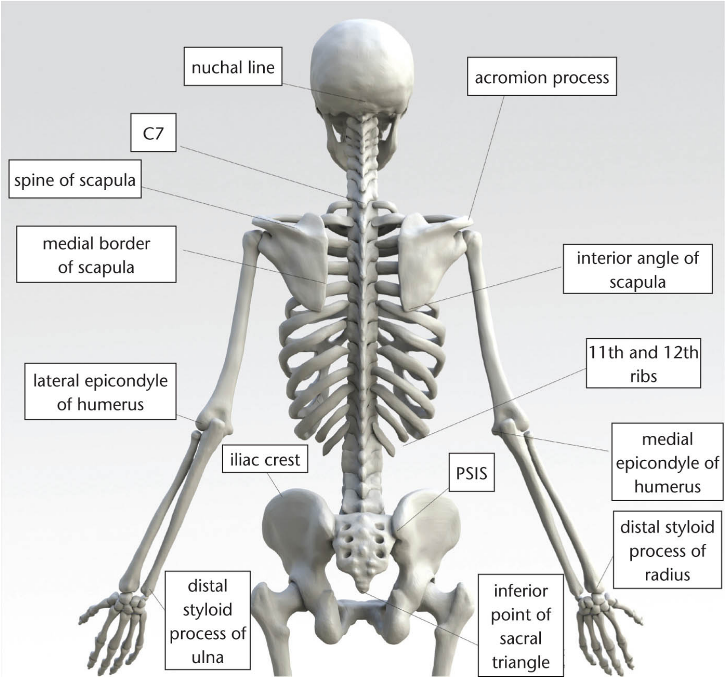


Fig. 95 Skeletal landmarks of the upper body seen from the rear.

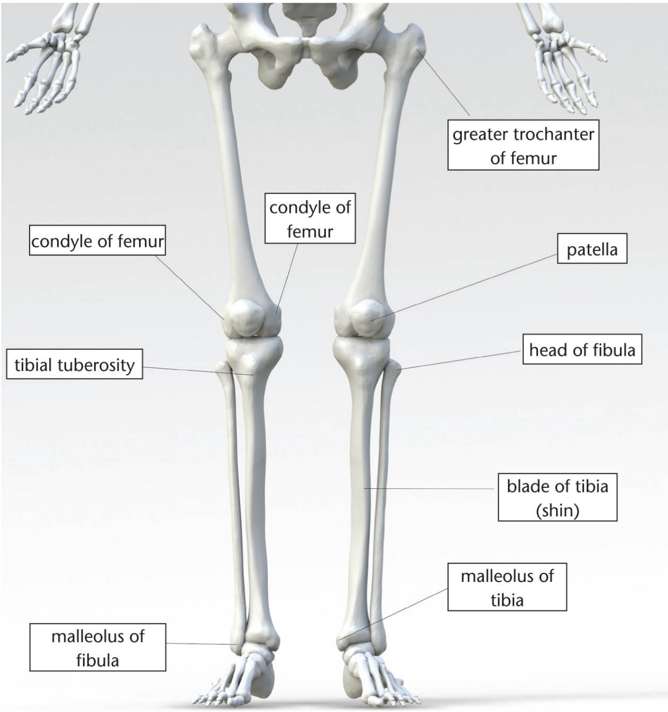


Fig. 96 Skeletal landmarks of the lower body seen from the front.

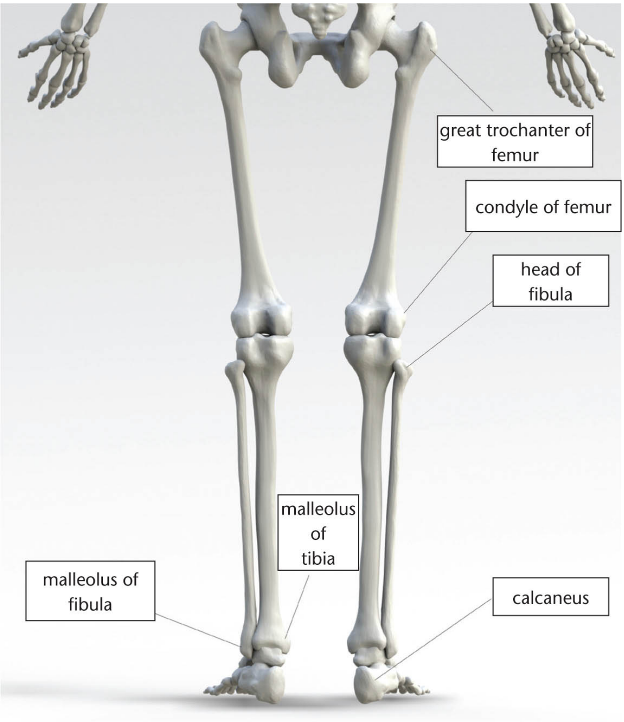


Fig. 97 Skeletal landmarks of the lower body seen from the rear.

Figs 98, 99 and 100 show digital sculptures of the rib cage in a series of views, accompanied by drawings showing simplifications of the form. The rib cage is narrower at the top and wider at the bottom, but widest just below the middle. In some views its egg-like character is dominant, in others it can take on something of a bulbous conical aspect. This should alert us to the fact that all these geometric abbreviations are conceptions – another sort of tool, if you like, and so not a definitive character. This is the thing with complex organic form: it can be usefully simplified, but never reduced to that simplification.

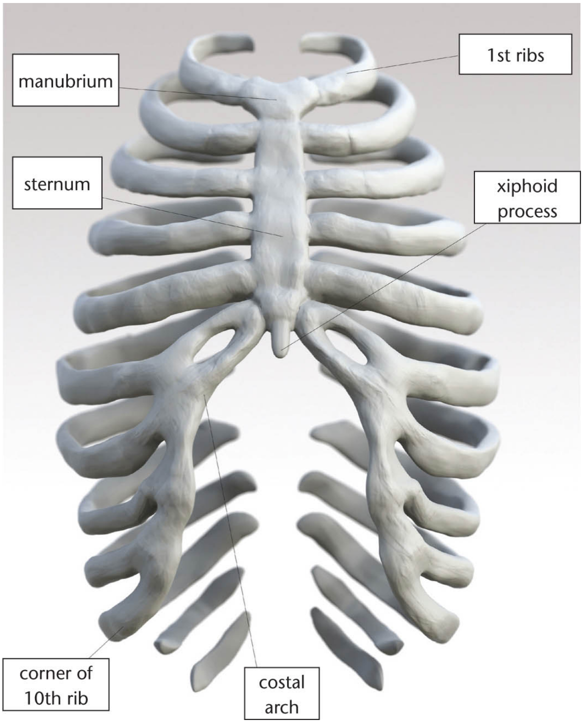


Fig. 98 The rib cage from the front.

Fig. 99 The rib cage from the back.

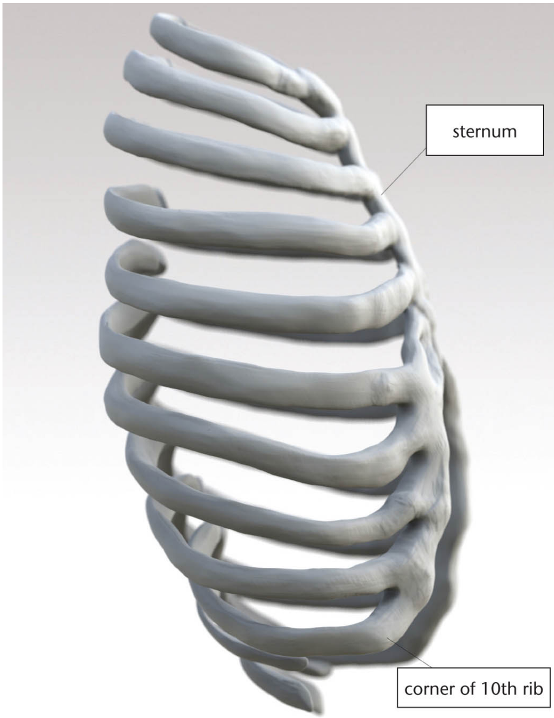


Fig. 100 The rib cage from the side.

The circle of the first ribs forms the basis of the cylinder of the neck. Note that the circle is lower in the front and higher in the back. To remember this, think of the way a necklace sits on the neck, fastening at a higher point in the back. The lower front point of this circle coincides with one of our critical landmarks, the pit of the neck. This leads us down to the planes of the sternum, and the costal cartilage. The ribs attach to the sternum or breastplate via this flexible cartilage, which allows for expansion of the rib cage. The points at which bone joins cartilage demarcate a key change in plane on the front of the rib cage. We are looking for changes in plane from side to side, and from up to down. The end of the sternum marks a change in plane from the chest to thoracic arch, or opening of the rib cage.

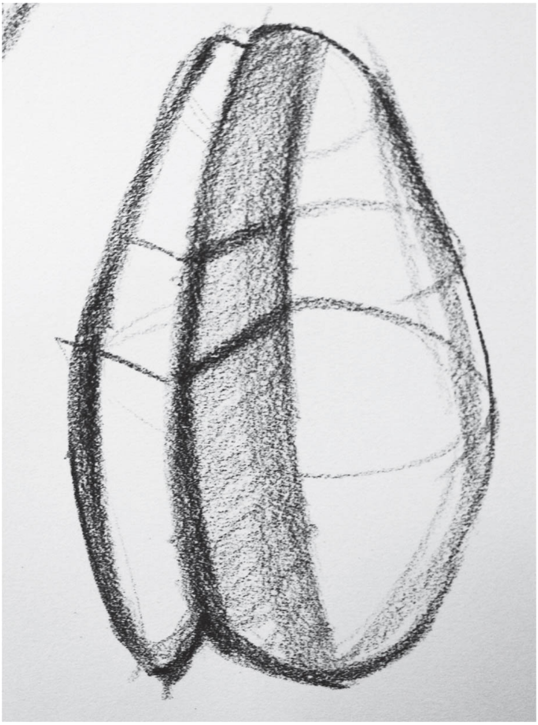


Fig. 101 Simplification of the rib cage seen in a three-quarter back view. Note the fluted channel of the centre of the back.

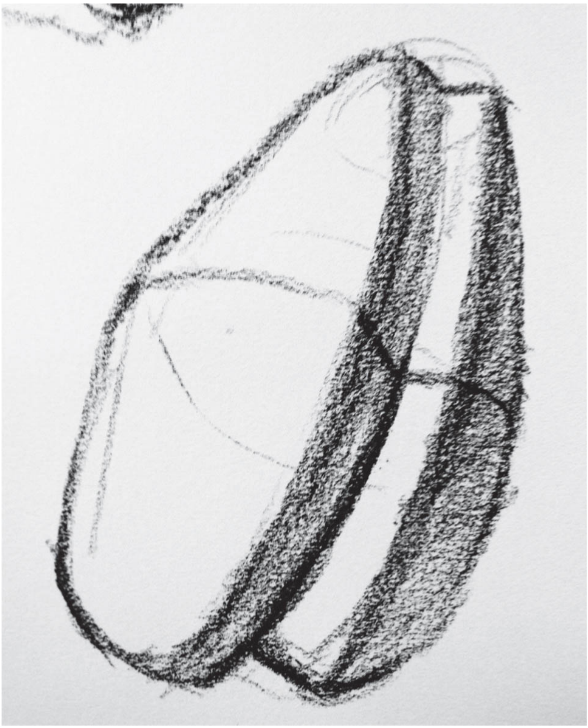


Fig. 102 Simplification of the rib cage, again from a three– quarter back view. These broad planes govern the smaller and more complex forms of the back.

In the back of the rib cage we have the thoracic vertebrae to consider. To simplify this, the interaction of the rib cage with the vertebrae in this area can be thought of as something like a fluted channel or gutter. We can plane off the egg volume of the rib cage in the side view and see that the upper part of the back of the rib cage can be imagined as a sort of shelf, curving down and then changing direction once more into what will be the beginning of the lower back.

The plane of this lower section echoes the angle of the sternum in front – both tell us about the distinct orientation of the rib cage in a standing body, which is tilted back. In the back view we see the floating ribs, numbers eleven and twelve. Nine, ten, eleven and twelve can sometimes be seen on the surface; in any case, together they create an important curving plane of the lower back.

In the front, the level of the fifth rib is important, as this is where we will find the lower border of the pectoralis major muscle. The level of the tenth rib marks the low point of the rib cage in the front view. Also pay attention to the character of the costal arch. This is visible in certain postures, and its forms blend in different ways with those of the muscles of the external oblique or flank muscle and rectus abdominis or abdominal muscles. It is a key organizing form of the torso, and should be considered early on.

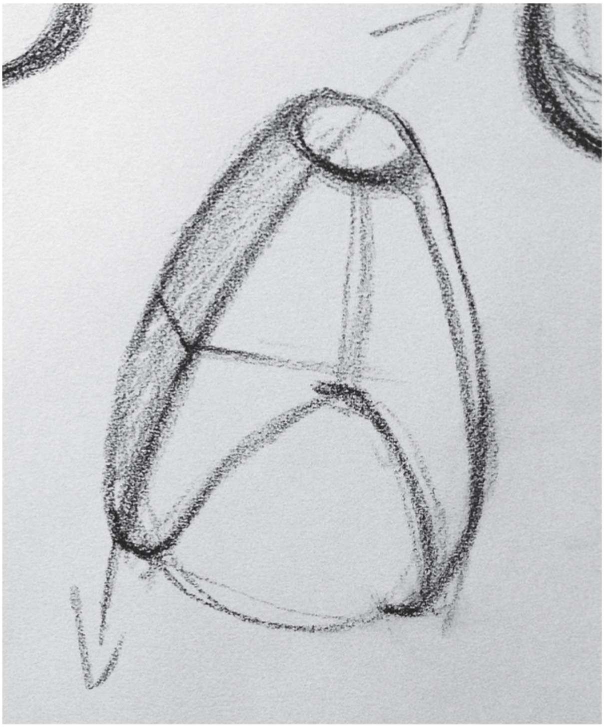


Fig. 103 Simplification of the rib cage seen from the front. The line with arrows denotes the change in plane along the meeting of bone and costal cartilage.

The breastplate consists of two main sections, the manubrium and the sternum. Overall, these resemble a necktie. At the bottom of the sternum we find the xiphoid cartilage, which sits a little further back. This sometimes presents on the surface as an indentation known as the epigastric depression, and marks the top of the costal arch.

The Pelvis

The pelvis is arguably the most formidably complex of skeletal structures, as it resists any straightforward simplification. It is formed of two wings of the ilium, each a mirror of the other meeting at a point in the front, and joined by a thick, curved, triangular block of bone called the sacrum in the back. Each wing is curved and twisted upon itself, and is something like a propeller form. We need to look for key points on this structure that present themselves on the surface and organize the form.

The upper part of the ilium or hip bone culminates in a ridge known as the iliac crest. Along this crest are key landmarks. The point at which the wings join in front is called the symphisis pubis – symphisis means ‘growing together’. This is a major landmark in the body, being generally the halfway point in the body’s total height. The next landmark is the anterior superior

iliac spine (ASIS for short). In the back we have the equivalent, the posterior superior iliac spine (PSIS for short).

Between these two we can find the high point of the iliac crest, and wide point. The iliac crest forms a graceful arc when seen from the side. From above, we see an open horseshoe curve that turns back on itself towards the posterior, forming an overall S-curve.

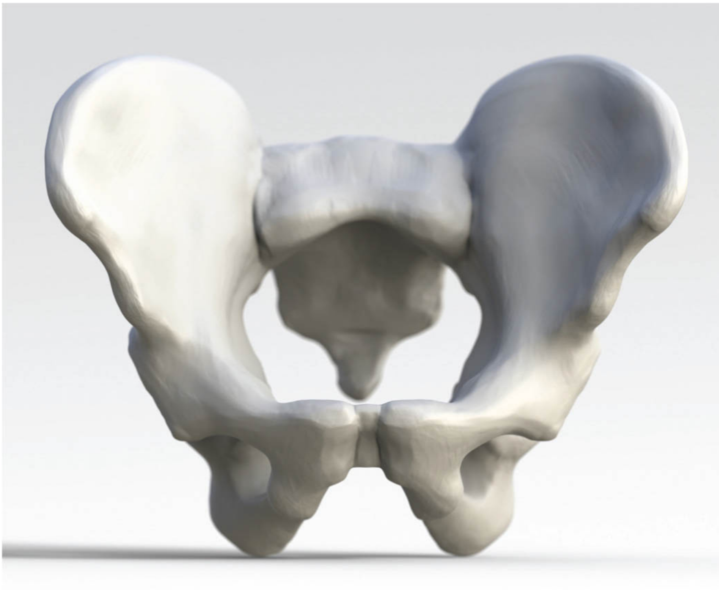


Fig. 104 The pelvis from the front.

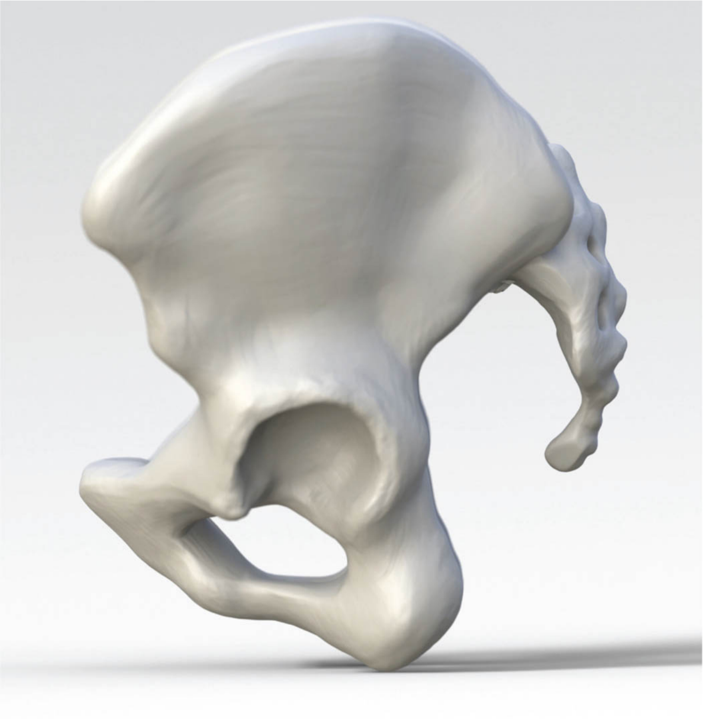


Fig. 105 The pelvis from the side.

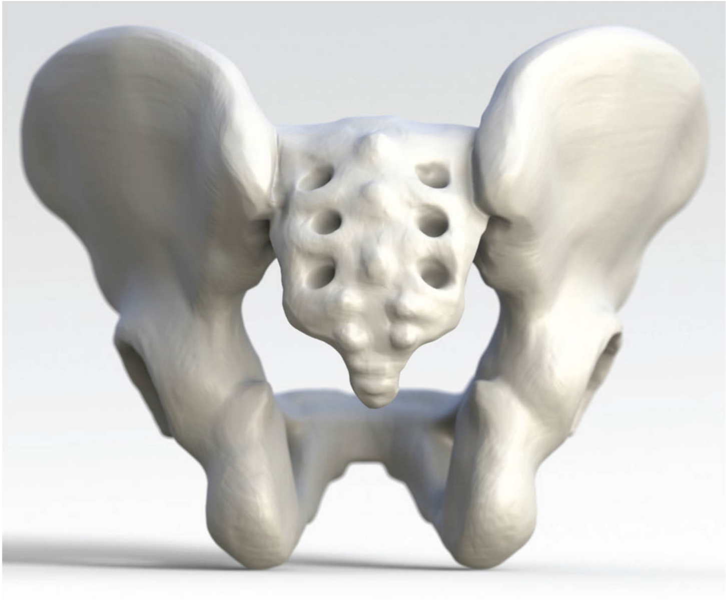


Fig. 106 The pelvis from the back.

The base of the pelvis is formed by the ischium, or sitting bones. These are not visible on the surface in humans – though they are in some animals where the pelvis is oriented differently – but it is important to know about them as they help to govern the form and function of the hamstring muscles of the upper leg.

The side of the pelvis is where we find the acetabulum ('little vinegar cup' in Latin), which is the socket where the rounded head of the femur plugs into the pelvis. A secondary landmark is the anterior inferior iliac spine, from which the muscle of the rectus femoris originates.

The Sacrum

The triangle formed by the posterior superior iliac spines and the base of the sacrum is often clearly visible on the surface as a triangular plane just above the division of the buttocks. The posterior superior iliac spines can also present as dimples on the surface. The base of this triangle is level with the symphisis pubis in front and so is also the mid-point of the total height of our figure.

Note that I say 'our figure' – this is something to keep in mind, that we are building a conceptual model which is convenient to remember. Many of these relationships will vary with proportional differences in bodies. The important thing is to get an idea of the construction so that we can more surely observe those differences by having a datum against which to compare them.

Essential Aspects of the Pelvis

The description thus far should confirm the fact of the complexity of the pelvis. We now need to find some way of reducing this complexity to something we can actually use. If the rib cage is tilted back in a standing figure at rest, then the pelvis is distinctly tilted forwards. With this in mind, we can think of the anterior superior iliac spines as forming the front corners of a box tilted forwards in space. On the front of the box we can locate the pubic symphysis; on the side of the box, at the same level as the pubic symphisis, we can locate the acetebulum; and on the back the triangle of the sacrum. The curve of the iliac crest can then be inferred.

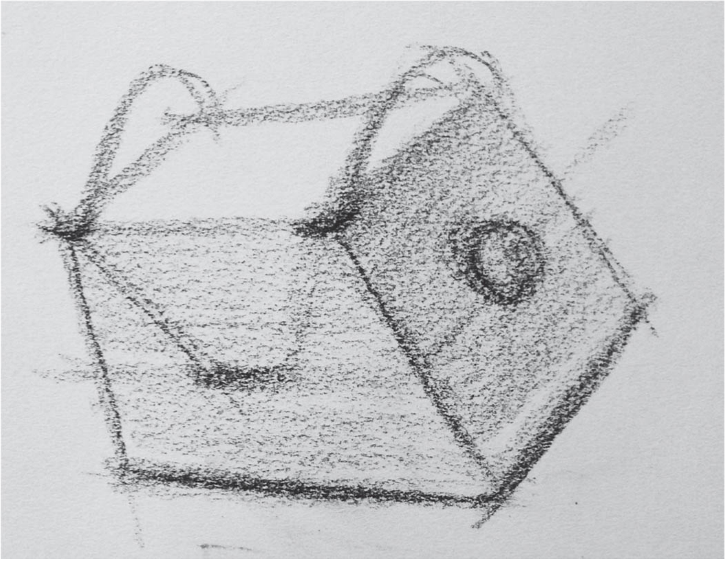


Fig. 107 Simplification of the pelvis. The anterior superior iliac spines can be imagined as forming the corners of a box form.

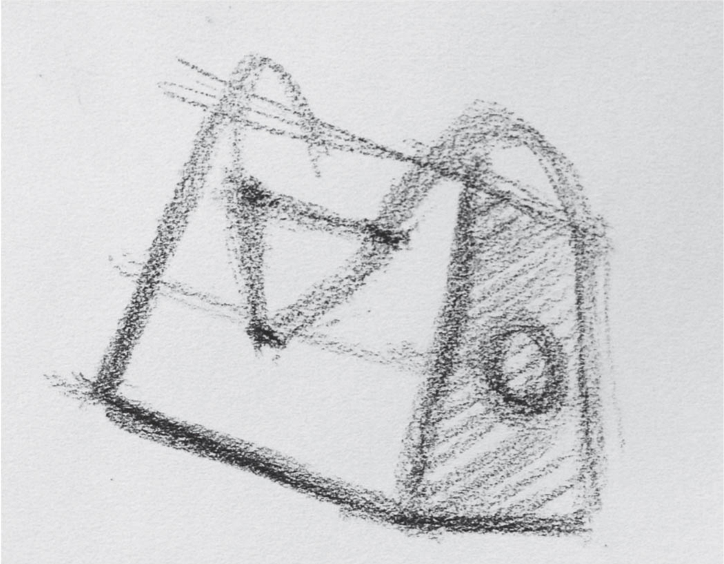


Fig. 108 Similarly, in the back view, the sacral triangle can be mapped onto the plane of a box.

Alternatively, we can think of the pelvis as something like a bowl, holding the ball-like form of the abdomen.

Key Facts

We are building this conceptual model of the body in order to explain things to ourselves, and to provide the basics of construction when drawing the body from memory. When working from observation the process is in a sense reversed.

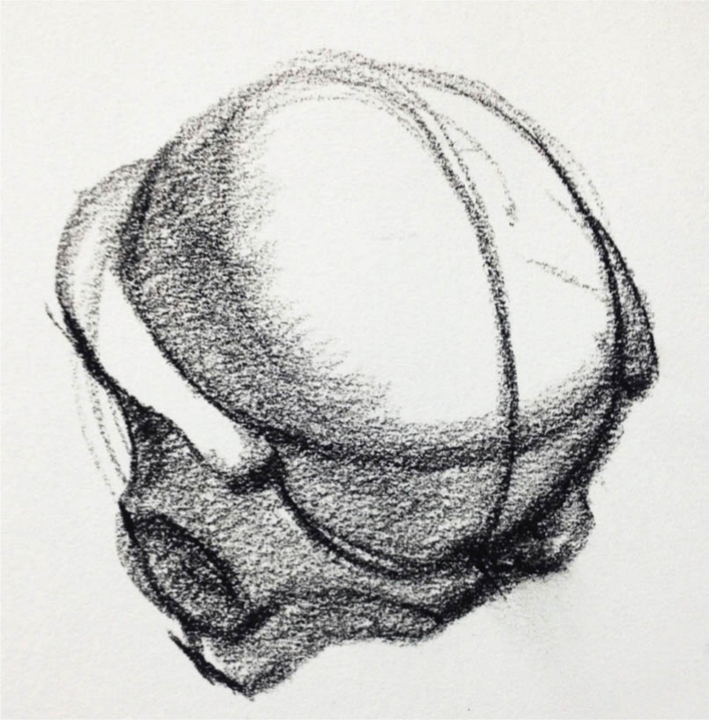


Fig. 109 The pelvis has a bowl-like structure, almost cupping the forms of the abdomen.

The box provides an explicit statement as to the location of a form in space. In the early stages of a drawing I may not yet have decided – or may not want to decide – so I will sometimes initially locate the pelvis by means of an implied egg volume.

Fig. 110 The pelvis and rib cage relationship.

The Skull

The skull consists of two main masses: the egg of the cranium, and the wedge-like block of the facial region. The cranium is another example of a planed egg form. It has areas that are flatter than we might first think – this is particularly true of the side planes of the head. The widest part of the skull is towards the rear of the cranium. The widest part of the face is at the zygomatic arch.

Fig. 111 The skull from the front.

Fig. 112 The skull from the side.

Fig. 113 The skull from the back.

The Frontal Bone of the Forehead

The forehead consists of the area above the orbital sockets, and between the temples. Directly above the orbital sockets we have the brow, which can be a prominent ridge in some people. Between the sockets is a crucial form, the glabella, which is like the keystone of an arch in shape and from our point of view, performs the crucial function of linking the two eye sockets and forming a strong relationship to the nose. At the outer edges of the forehead region we find the temples, which are marked by the beginning of the temporal line of the skull. This is an important area for us, as it marks the corner where the front of the head turns sharply into the side of the head.

The Eye Sockets

The eye sockets, as you would expect, are cavities for the eyeballs, and it is easy to misinterpret these as circular black holes: for our purposes, we soon see that in fact it is misleading and unhelpful to interpret each of these as a void. We need to pay attention to the structures that surround and form that void. There are many of these from the brow ridge, discussed earlier: the maxilla, the zygomatic arch, the supra orbital margin, the inferior orbital

margin, the glabella and the nasal bone.

Eye Socket Variation

Some eye sockets are very angular, some are rounder, some wider than high, some higher than wide. There is immense variation, so what is offered here is a kind of temporary norm in order to make things convenient to remember. Such norms are therefore to be taken with a pinch of salt. Though they are often based on anthropological averages, they also have a lot to do with the ways in which human anatomy has been understood historically, that is to say, in relation to various sorts of ideal or norm.

The Cheekbone

The zygomatic bone begins at the point where the plane of the maxilla breaks sharply to the side. It then moves into the zygomatic arch, which wends its way towards the ear canal. The upper part of the zygomatic arch forms the side of the eye socket.

Fig. 114 Simplification of the structure of the skull, concentrating on the major planes.

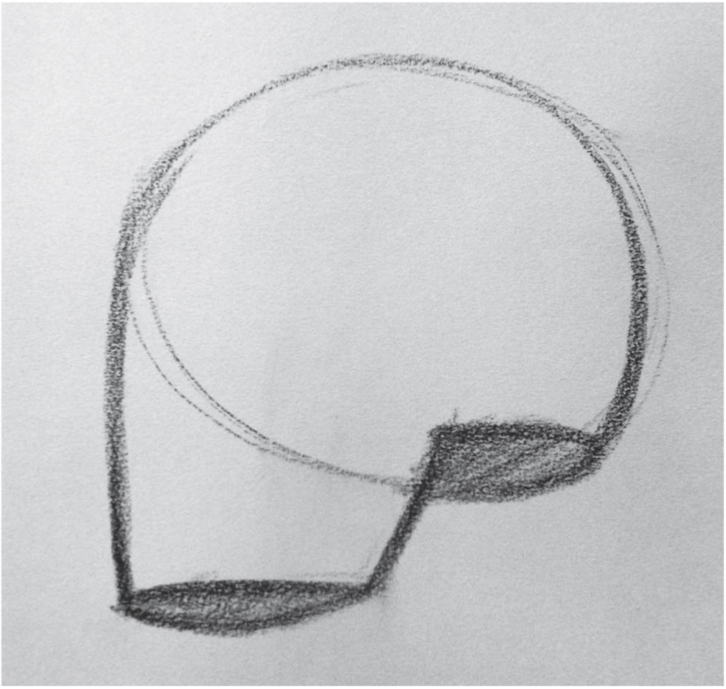


Fig. 115 The relationship of the mass of the cranium to the facial structure - the cranial mass is larger than we tend to think.

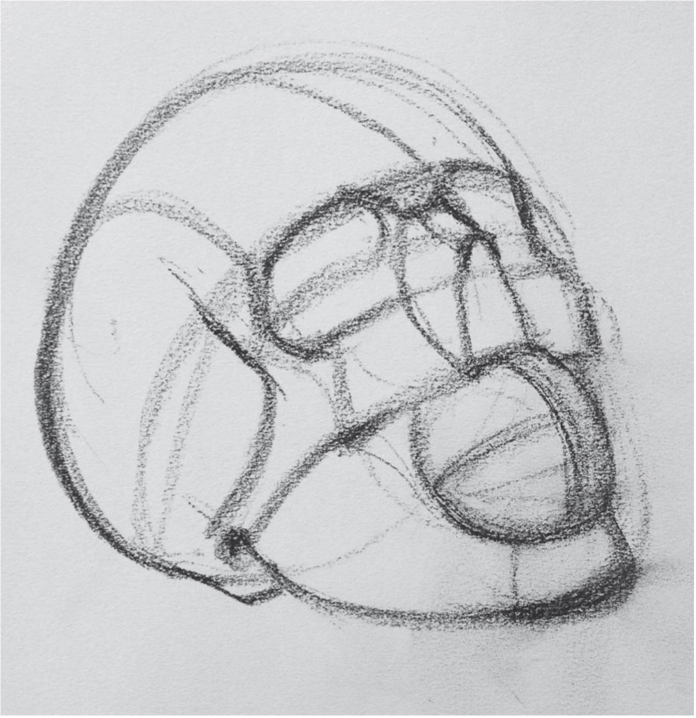


Fig. 116 Further planar analysis of the skull.

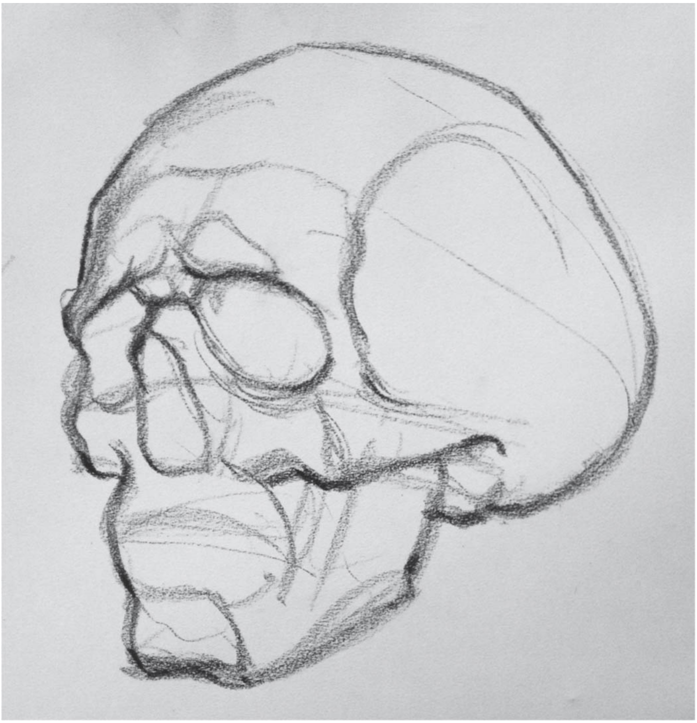


Fig. 117 Refinement of basic skull structure – here we begin to see more emphasis on individual characteristics.

The Nasal Bone

The nasal bone projects outwards just below the glabella. The important thing to note is that it has a distinct top plane, and distinct side planes. The tip of this bone is the point at which the nasal cartilage begins, and is often visible as a plane change in the nose.

Mastoid Process

The mastoid process is a distinct lump located just behind your ear, from which the sternocleidomastoid muscle of the neck springs. It is on the same level as the base of the skull, the base of the cheekbones and the base of the nose, giving us a very convenient three-dimensional construction line around the entire head.

Nuchal Line

There are actually two nuchal lines, an inferior and a superior, the superior being part of the origin of the trapezius. This line on the skull is a useful

marker for the beginning of the neck in the back view.

Maxilla: Tooth Cylinder or Muzzle

The maxilla gives us the form that will eventually determine the nature of the lips, and is yet another example of how the bony structure conditions the surface form. The teeth are arrayed on a curved plane something like a cylinder, though this plane is also convex from top to bottom. An awareness of this large underlying form makes the job of rendering the light and shade of the mouth much easier.

Mandible: The Jaw

The jaw is in itself a complex form to understand. However, as with the pelvis and many other complex skeletal forms, we can reduce this to a collection of key points and defining features. Here we will look primarily at the box-like form of the chin and the rear corners of the jaw, as this will allow us to simplify the structure in a couple of ways: as a tapering wedge form, or a thick horseshoe-type structure. Pay particular attention to the area that will make up the chin: because the facial features are the most psychologically compelling aspect of the head, the tendency is to overstate them and miss the equally structurally significant forms of the skull. The chin is often a casualty of this, and it is common to see an underdeveloped chin and an over-sized mouth in drawings of the head.

The Shoulder Girdle

The shoulder girdle is made up of the clavicles and the scapulae. On each side the clavicle and scapula are simply our collarbone and shoulder blade, but together they form an extremely complex and mobile structure which facilitates the vast range of motion of the arms. Before considering this range of motion, we should start by considering the form of the bones.

The Clavicle

The clavicle is a good introduction as to how we might approach studying the long bones. We have seen how we can approach this by thinking of this bone as a series of distinct cross-sections strung along a path, in this case an S-curve. Thus here we have a triangular cross-section, transitioning into a circular crossection, transitioning into a rectangle. Breaking down the form in this way gives us a kind of ‘recipe’ for drawing the bone from our imagination, as we have already established the vocabulary with which to do this.

Scapula

As a basic conception, the scapula is essentially a flat triangle of bone with a significant protruding ridge. To refine this, we take into account that it is somewhat cupped in order to facilitate its movement over the primary egg form of the rib cage. It has a rounded platform called the glenoid fossa, against which the rounded head of the humerus, the bone of the upper arm, can articulate. There is also an interesting sub form, the coracoid process (*see* Fig. 118), which provides a hook for the short head of the bicep muscle. It can also sometimes be seen on the surface in certain poses if a subject is very lean.

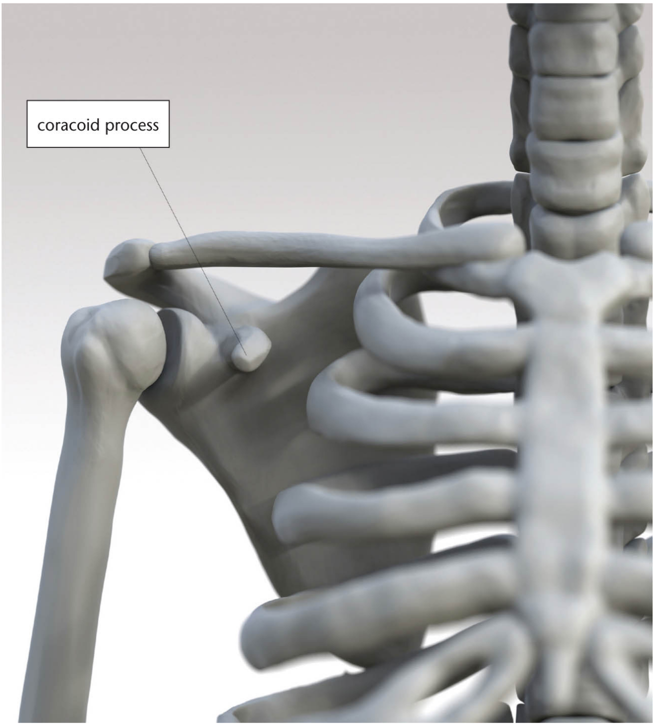


Fig. 118 The coracoid process of the scapula.

The scapula is a good example of how each facet, bump and rough patch on the skeleton can be explained as providing a surface for a particular muscle to attach: the muscles of the infraspinatus and teres major are packed neatly on to its concave surfaces.

The spine of the scapula begins on its inside border, and this point is often visible as a depression on the surface. The spine continues out eventually to meet with the end of the scapula. The extreme end of the spine of the scapula is a flat platform called the acromion process. The length of the spine of the scapula is subcutaneous, and so one of our landmarks in the construction of the figure.

The Arm

Humerus

The humerus is another long bone, which means we can take the same approach to analysis as we did with the clavicle. The shaft is essentially a cylinder, which transitions with a subtle twist into a triangular cross-section. The ends are more complex. The proximal end consists of the ball and socket joint of the shoulder: to refine it, we can think of it as a third of a sphere atop a sort of neck, which is compressed from front to back. This articulates with the *glenoid fossa* of the scapula. The convexity of the head of the humerus can be felt under the skin of the shoulder in front. The head also has two bumps, or tubercles, between which a groove can be found, which channels the tendon of the long head of the biceps.

The distal end flares out from the triangular cross-section of the lower part of the shaft. It consists of three main elements: a rounded platform against which the radius will turn, a spool-like form in the middle, and a distinct protrusion called the medial epicondyle. The lateral epicondyle is found on the external side of the bone. These epicondyles, along with the point of the olecranon, form the three key skeletal landmarks of the elbow, and are the points from which many muscles spring.

Ulna

The ulna transitions along a slightly curved path, from a block, to a triangular prism, to a cylinder. The block is the olecranon, the point of the elbow. This block can be thought of as having a chunk taken out of it, leaving something like a gripper which 'bites' on to the spool of the distal end of the humerus. This forces the basic hinge mechanism of the ulna, which can essentially only move up and down, like a lever.

Radius

The path of the radius is an S-curve. The radius has a general cross-section, though it becomes more cylindrical at the proximal end, and almost a semicircle in cross-section at the wrist. The end of the bone that mates with the wrist is larger, and a way of understanding the motion of the radius is to think of this end as following the thumb. This end of the radius is key to understanding the muscles of the wrist, and it also has several grooves to channel the tendons of many of the extensor muscles of the forearm.

The end that mates with the humerus is rounded and cupped – this part rotates the bone on its axis upon the surface of the curved plane of the part of the humerus nearest the lateral epicondyle.

An important feature to consider is the radial tuberosity, a protuberance which provides an insertion point for the tendon of the biceps.

These key skeletal points govern the vectors of the muscles and help us to understand how the body's morphology deforms.

The Hand and Wrist

The Carpal Bones

The carpus consists of eight small bones, but for our purposes they can essentially be simplified into an overall ovoid mass. Part of this form is convex, in the same plane of the back of the hand. The palm side of the carpus is concave, and has several protuberances, two of which are of particular significance: the processes of the pisiform and the hamate.

The Metacarpal Block

We can treat the metacarpal bones of the four fingers as a block, as they are relatively stable. The thumb has a different range of motion so will be treated differently. The metacarpal bones extend the convexity and concavity of the carpus, being cupped on the palm side and convex on the back of the hand. The metacarpals radiate out from the carpus, and are also arrayed in a curve across the back of the hand – observe this on yourself by pointing your hand away from you and noticing that the knuckle of the middle finger is highest, with the others dropping off to each side.

Each carpal bone can be simplified in the same way as we have treated the long bones. They have a generally triangular cross-section, with the end nearest the wrist being block-like, and the end at the knuckle having a spheroid surface to enable articulation with the phalange of the finger.

Phalanges

Each finger has three phalanges, the thumb has two. They are similar in structure to the metacarpals, though the very final phalanges are more triangular with a protuberance to support the nail.

The Legs

The Femur

The femur has a triangular cross-section, more cylindrical towards the top, and more trapezoid towards the knee. From the front, it is oriented at a distinct incline in towards the centre line of the body. It is a common mistake to assume the legs function like pillars and so run straight up and down: in fact they are much more dynamic in form. From the side, the femur has a forward convex bend, putting the knee much closer to the back of the body than we might think.

Fig. 119 The bony structure of the knee is extremely prominent in the living figure.

The rough strip on the back of the femur is called the linea aspera and provides a surface for muscles to grip on to. The two ends of this bone are large and full of character. The end that plugs into the pelvis has, like the humerus, a spheroid end atop a kind of neck. This is where we start to see affinities between different parts of the body, and how the prominent forms of one part might help us to understand the subtle forms of another, and vice versa. This neck can be thought of as emerging from the block-like form of the great trochanter.

The lower end of the femur is more of a quadrilateral trapezoid in cross-section. The function of this substantial bony form is to transfer weight to the platform of the tibia, and to roll back and forth on its surface. The underside of this end of the femur forms a kind of spool in order to do this. On the lateral and medial sides are found two condyles, which are close to the surface of the skin.

The Tibia and Fibula

The tibia can be thought of as an elongated T-shape from the front. The shaft is a sharp triangular prism in cross-section, the point of which forms the ridge or blade of our shin. This ridge forms an elongated S-curve. The surface of this prism on the medial side, towards the centre line of the body,

can be felt directly below the skin along its entire length. The top end of the tibia, which provides a platform for the femur, is, like that end of the femur, a trapezoid in cross-section, wider at the back and narrower in the front. The front presents us with another landmark, the tibial tuberosity, almost like a 'nose' for the tibia.

The lower end has four sides in cross-section: on the inside there is a process called the medial malleolus, our inner ankle bone; on the outside there is a slightly scooped surface to provide a place for the fibula, the lower end of which forms our outer ankle, which is lower than our inner ankle. Together these form a wrench shape which grabs the talus bone of the foot. The shaft of the fibula is again triangular in cross-section, and though it has a twist, can essentially be thought of as a straight vector from ankle to knee. Its shaft is concealed by muscle, and so it only presents itself at its two ends.

The upper end connects with the platform of the tibia and provides a point to which the tendons of the hamstring muscles descend. This point is often clearly visible as a bump on the surface of the body and so is one of our visible landmarks.

The Foot

The foot, like the hand, is extremely complex, and along with the hand could easily merit a book of its own. Essentials can be sketched out, however, and in many ways the foot is a great aid in understanding the hand, as it is a good deal more stable, and has larger forms. The logic of the forms is similar: there are tarsal bones, metatarsals and phalanges. The good news is that the phalanges are basically similar in structure to those of the fingers and so can be broken down in the same way.

If we work from large to small, we would start by looking at the calcaneus, the bone of the heel. This is a fantastic, gnarly lump of a bone, and is, with the Achilles tendon, active as a kind of lever. On its top surface it has a kind of saddle, on to which a bone called the talus sits. As mentioned above, this fits into the surface of the lower end of the tibia.

The other bones of the tarsus, like the carpal bones of the hand, form a packet or cluster that bridges the way between the ankle and the metatarsals. They have a variety of facets which articulate with, and determine the particular array of those metatarsals. Again, these are not dissimilar to the metacarpals of the hand, though they are much more varied in size, from big toe to smallest toe.

Critical Skeletal Landmarks

The skeletal forms therefore provide a lot of information, and the best way to summarize this is to think about how that complexity can inform the idea of gesture that we began with. We want to be informed about the structure of the body in the early stages of a drawing, but we also want to travel light. This is why we focus on particular skeletal landmarks that are of critical importance. These are the primary consideration in studying anatomy for

figure drawing. We begin with the skeleton because it is a rigid frame which determines the form of the muscles and flesh it supports – the bones force the form. The landmarks outlined here are visible on the surface of any body as they are the bony points to which skin is bound most tightly. This means they can be seen regardless of physique.

The landmarks are as follows:

Head:
Mastoid process
Frontal bone
Brow ridge
Temporal line
Nuchal line
Point of jaw
Nasal bone

Torso:
Acromion process
Clavicle
Sternum
Ninth rib
Anterior superior iliac spine
Iliac crest
Sacrum triangle
Spine of the scapula
Lateral border of the scapula

Arm and hand:
Lateral epicondyle of the humerus
Medial epicondyle of the humerus
Olecranon
Distal process of the radius
Distal process of the ulna
Ulnar furrow
Carpus
Metacarpals and phalanges

Leg and foot:
Great trochanter
Epicondyles of the femur
Patella
Tibial tuberosity (kneeling point)
Head of the fibula

Using Skeletal Landmarks

The Head and Torso

We can return to the simple, egg-like forms of our rib cage, pelvis and skull.

If we join the eggs of the rib cage and pelvis, we get a kind of bean shape that can be bent and twisted. We can then superimpose some idea of our skeletal landmarks on top of this. We can keep the skull simple at this point, leave off the shoulder girdle for now, and deal with the following:

Pit of the neck
Epigastric depression
Costal arch
Furrow of spine

Pubis
Anterior superior iliac spine
Sacrum triangle
Great trochanter
Iliac crest

This gives us fewer than ten points to deal with for now, and this is a good block of information to practise and get familiar with. It is a good thing to draw this from imagination over the top of our basic forms, and also to look for these points when drawing from the model.

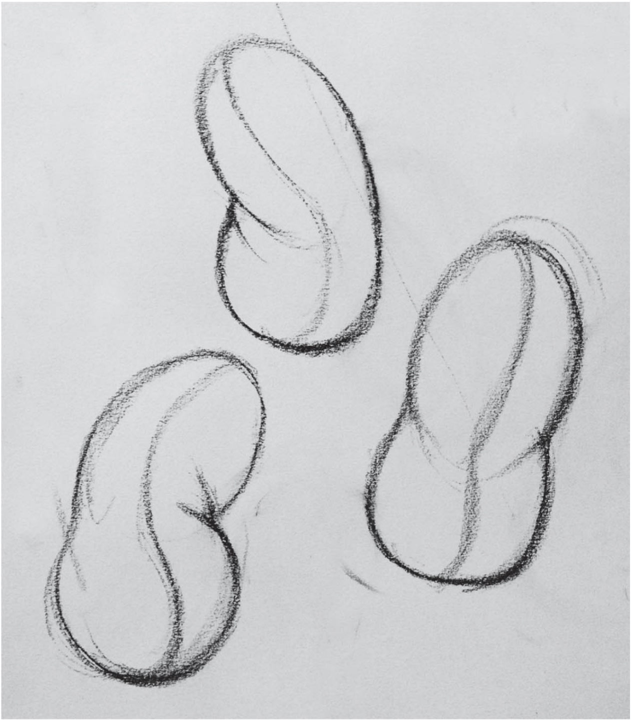


Fig. 120 The torso simplified to a basic bean form – consider this a compound form, containing rib cage and pelvis.

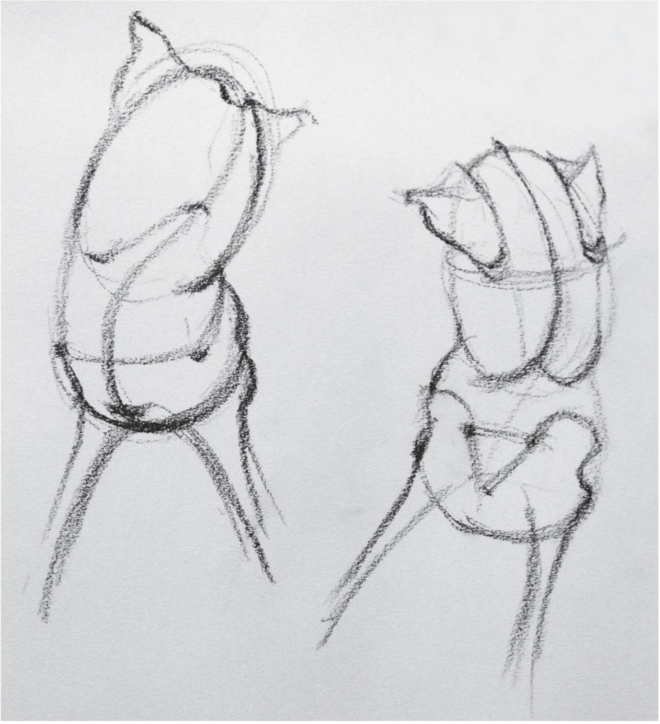


Fig. 121 The bean form with added skeletal landmarks.

The Legs and Feet

We are looking for shorthand at the moment. The legs can start with basic gesture lines, and we can then use skeletal landmarks to home in on more precise information. Remember that we can double the height of the torso and head to arrive at an idea of the total height of the figure. It is important to allow yourself the freedom to change proportions as you go, however, as it is easy to become a slave to proportional principles like this, which are best used as a guide or check. The ends of the femur and tibia bones can have their block-like nature indicated, and place the tibial tuberosity which leads us to the S-curve of the blade of the shin. The ankles gripping the tarsus of the foot, and then a basic indication of the overall wedge/door-stop form of the foot will set us up quite well.

The Shoulder Girdle and Arms

This is a complex area in terms of articulation, and we will revisit some of these complexities in relation to the musculature. For now, we can simply place a generic indication of the triangular planes of the scapulae on the back of the torso. From the front, we would be thinking about the clavicle.

In either view, the point where they meet, at the acromion process of the scapula, is our crucial landmark, the shoulder point. From above, the relationship of the scapulae to the clavicles forms something like a diamond shape, fitting over the cylinder of the neck. To get a rudimentary understanding of the articulation of the shoulder girdle, we can almost consider the clavicles to be the third bone of the arm. When the arm is raised, the clavicle moves up also. We can treat the bones of the arm in the same way as we treated the legs – as gesture lines with indications of landmarks.

Fig. 122 Try making gesture drawings as before, but indicating the major skeletal landmarks.

The relationship between the olecranon of the elbow and the lateral and medial epicondyles of the humerus changes according to the articulation of the elbow joint. When the arm is straight, these landmarks are arrayed in a straight line. When the elbow is bent, the olecranon drops down, and so the landmarks form a triangular arrangement. We can group the complexity of the hand and wrist into block-like planes for now. Overall, we can now combine the gesture drawings at the start of this chapter with a sense of volume and an awareness of the critical points on the skeleton.

Remember that drawings like this are a form of study to help internalize the anatomy – they are not necessarily the way one would go about working from life or even from memory, which may be a good deal more fluid – so

experiment and repeat. Developing a strong sense of the skeleton sets us up very well for an understanding of the musculature.

Fig. 123 Skeletal landmarks are key to understanding musculature.

CHAPTER 5

MUSCULATURE OF THE UPPER BODY

When looking at anatomical diagrams we are essentially dealing with conceptualizations of the skeletal and muscular system, and it is important to remember that the images shown here are not quite what is 'really there'. There are all sorts of other tissues and fat deposits that make up the final form of the body, and in some places I have altered muscular form to approach that surface more closely. For instance, the gluteus maximus has been given extra volume in order to closer approximate the final surface, which in reality is made up of a good deal of fat. This is just to say that these examples are geared towards sculptural form rather than medical accuracy.

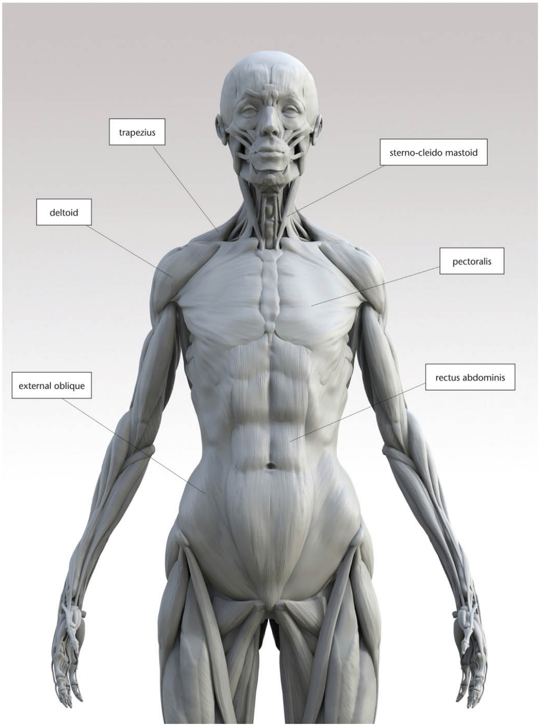


Fig. 124 General view of the upper body musculature from the front.

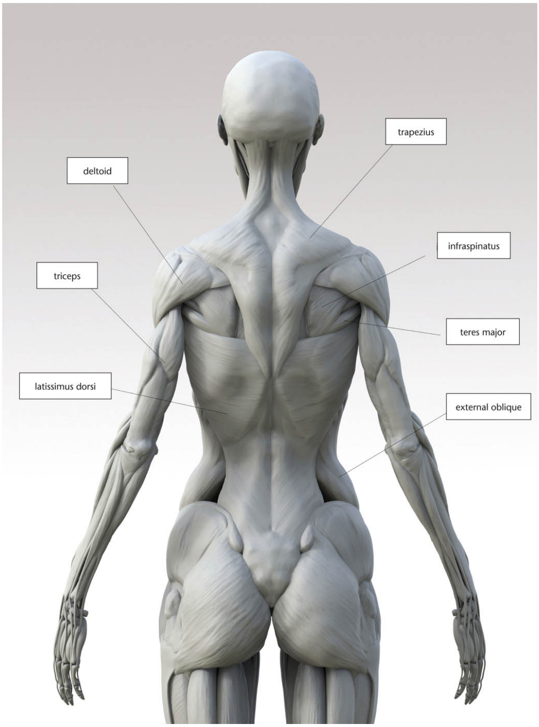


Fig. 125 General view of the upper body musculature from the back.

Grouping Muscles

From a medical point of view, the small differences between individual muscles can be very significant. From the point of view of figure drawing, however, we are primarily concerned with form, and so it often makes sense to group certain muscles based on how they present themselves on the surface of the body. The example here is the erector spinae group, which is in fact composed of multiple bundles of muscular tubes. For our purposes, we can group them together because their significance as form is that of two larger tube forms making a common mass, like cables that run from the sacrum to the rib cage, and can be thought of as augmenting the supporting function of the lumbar region of the spine.

The Torso

We can begin by considering three muscular areas: the abdominal muscles, the muscles of the flank, and the muscles of the lower back or lumbar region. More specifically, we are looking at the rectus abdominis, the external oblique, and the common mass of the spinal erectors.

These muscles are a good introduction as to how we will approach the study of the musculature more generally, as they clearly show how muscular

groups work in opposition to one another. For instance, the rectus abdominis muscle runs from the top of the costal arch to the pubic symphysis, and helps to compress the torso, bending the body forwards. Conversely, the spinal erectors work to compress the torso the other way, bending the body back. The external oblique muscles, on the lateral aspect of the torso, work to bend the upper body from side to side, and also to rotate the torso on its vertical axis. This function is evident in the spiral-like nature of the muscle fibres themselves.

In form, these muscles fill the space between the rib cage and the pelvis and are the flexible mass that gets pinched and stretched in relation to the movement of the rigid bone.

Muscles of the Front Torso

Rectus Abdominis Construction

The rectus abdominis originates from the pubic symphysis, and inserts into the fifth, sixth and seventh ribs. It is like a taut sheet joining the rib cage to the pelvis. This sheet is divided down the middle by a line of fascia which goes down as far as the navel, where it terminates. The fibres on either side of this are divided into rectangular bundles or packets. This is what is referred to when someone is described as having a ‘six pack’.

From the point of view of construction, we find four of these fleshy bundles occupying the space just under the costal arch, and above the navel – this then, would be a four pack. Whether or not a person has six of these abdominal sections is a matter of genetic variation, and there we would see the development of two half bundles just above the costal arch, where the muscle inserts into the ribs.

Below the navel, the rectus abdominis forms a distinct downward-facing plane, ending at the pubic symphysis. This fact is important because it helps us to understand the construction of this part of the body as it is an area with highly variable fat distribution. As a rule of thumb, we can say that no matter what the physique we are dealing with, the abdominal area has to run from just below the end of the sternum to the pubis: everything happens between these two skeletal locations.

External Oblique Construction

This muscle originates from the surfaces of the last eight ribs and inserts into the iliac crest of the pelvis. It also joins the rectus abdominis via an aponeurosis, and attaches to the inguinal ligament of the pelvis, which forms the boundary between the torso and the legs in front.

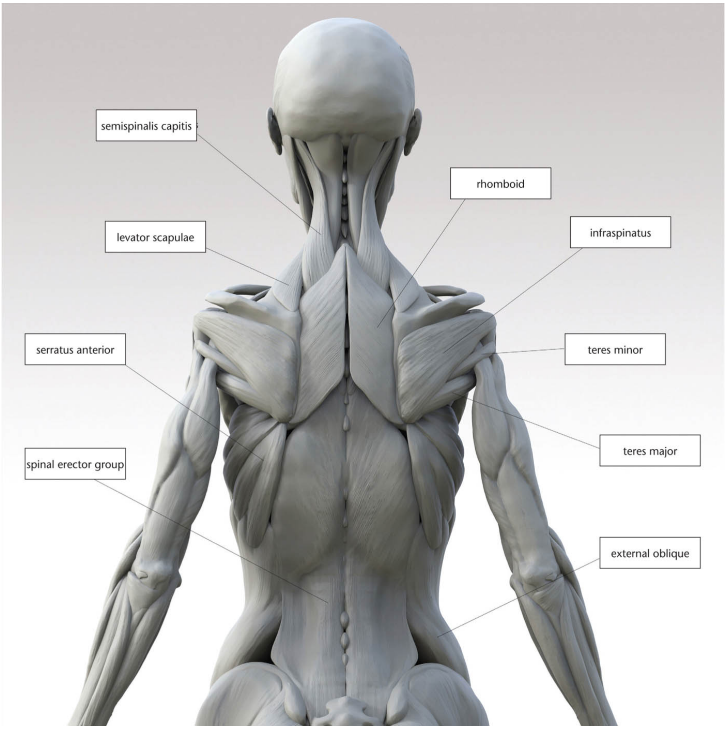


Fig. 126 The deeper muscles of the back.

This is a complex muscle and is perhaps best understood in two sections. There is the thinner upper part of the muscle which is attached directly to the rib cage, and the more bulging, fleshy portion which fills the gap between the rib cage and pelvis in the side plane of the body.

Upper portion: This part of the muscle attaches to the rib cage by means of a number of digitations – like fingers reaching out and grabbing on to the rib cage. These interlace with the digits of the serratus anterior muscle – more on that relationship below. These digits, when developed, can be very pronounced, and are often mistaken for ribs. However, this is understandable as this is a complex area in terms of surface form. With variations in pose and articulation, we can see a complex blending of the form of the muscles, the form of the ribs themselves, and the indentations or furrows which are found between the ribs.

Lower portion: This part of the muscle is given extra thickness by underlying layers of related muscles, as well as having more bulk itself. It has a very characteristic teardrop shape, of which much is made in terms of a decorative rhythm in classical sculpture. This part of the muscle follows the direction of the iliac crest but does not correspond exactly to its contour – the external oblique droops slightly over the bone.

Understanding the Muscles

Not everybody has developed musculature, so why it is important to understand the muscles? This is a common question. Of course it is true that highly defined musculature is not a feature of the average physique. However, it is the bones and muscles that set up the planes of the body, and this is what we are ultimately interested in. These planes are consistent across a range of physiques: thus the plane of the sternum and pectoral region tilts back and up, the plane of the lower abdomen cuts back and faces down, and so on. When you understand the bones and muscles, you are more able to grasp the way their forms are attenuated by skin and fat tissue.

Pectoralis Major

The major muscle of the chest, the pectoralis major originates from the clavicle, two thirds of its length from the pit of the neck outwards; from the sternum; and also from the cartilage of the first six ribs, as well as the surface of the fourth and fifth ribs. It also has attachments to the aponeurosis of the rectus abdominis – there is much interesting form to be observed where the muscles of the torso meet each other along such borders.

Muscles always have to cross a joint in order to function, so the insertion of the pectoralis major is into the upper arm, the bone called the humerus. Animal anatomy provides many useful and illuminating comparisons – here we might think of the function of the pectoralis muscle in birds, which is to flap the wings. This muscle teaches us some good anatomy lessons. It has multiple points of origin and insertion, and so the directions of its fibres are like vectors from one point to another.

There is a bit of complexity here because the higher points of origin, such as from the clavicle, head towards the lower points of insertion, and vice versa. This means that there is a crossing of the fibres, lending the muscle its characteristic twist and tuck, when seen at rest. Also, this is the first time we are dealing with a muscle which attaches itself to the shoulder girdle, which is capable of a great range of movement. From the point of view of surface form, this means that we see a great deal of change in the pectoralis as the arm moves. We will see more on this when we look at the scapulo-humeral rhythm.

Pectoralis Minor

Where there is a major, there is a minor, and so it is worth mentioning the pectoralis minor, which originates from the third, fourth and fifth ribs, inserting into the coracoid process of the scapula. In some poses, and in some bodies that are very lean, it is possible to see this muscle contributing a small relief to the area where the front plane of the chest begins to turn to the side, filling out an area which might otherwise become concave. Also important to note is the fact that the pectoralis muscle forms the front wall of the armpit, clearly apparent when the arm is raised.

Serratus Anterior

Assisting in the movement of the arm, the serratus anterior originates from the first eight or nine ribs (again, we have genetic variation), and inserts into the spinal border of the scapula. Like the upper portion of the external oblique, this muscle attaches to the rib cage by means of a series of digits. The digitations of both these muscles interlace, forming a distinct, curved, sawtooth pattern.

Overall the muscle is something like a fan shape, or a clam shell. Only the last three or four digitations are visible on the surface, as the muscle is partly covered by the pectoralis major and latissimus dorsi. The fact that it attaches to the scapula is important to note, however, as it is here that, despite being covered by the latissimus dorsi, the serratus anterior presents a clear convexity on the surface. This can sometimes be mistaken for a continuation of the border of the scapula.

Fig. 127 The serratus anterior muscle highlighted in orange.

The Muscles of the Back

The back is one of the hardest areas of human anatomy to understand. This is because of the complexity of the muscle layers, and the large degree of deformation of these layers by the freedom of movement that the shoulder

girdle has. The static formation of the muscles in a standing position is warped and stretched in various ways as the rib cage is tilted forwards, tilted side to side, and twisted on axis. The same movements occur with the pelvis, so that is also a factor. We can add to this the complex movements of the scapulo-humeral rhythm, which we need to examine before we look at how the musculature is affected.

The Scapulo-Humeral Rhythm

This is a term used to describe the articulation of the upper arm and shoulder. When the arms are at rest, hanging by the side of the body, the scapula and clavicle remain in their basic position. However, when the arm is raised out to the side, the scapula begins to swing outwards, and also to slide around the rib cage – this explains the cupped underside of the scapula, which facilitates this gliding motion.

When the arm rotates beyond 90 degrees, the scapula continues to slide around the rib cage towards the front of the body, and the outer end of the clavicle also begins to rise, the internal end remaining fixed at the pit of the neck. There is also some rotation of the clavicle on its axis at this point. All this happens in a particular ratio, which can be broken down. It can be useful to study the articulation of the skeleton in this way because it can provide a background awareness when drawing which can help to regulate errors.

This ratio of movement applies after the first 30 degrees of rotation of the arm, which has no effect on the basic position of the scapula. After this point, that first 30 degrees can be discounted, and then a 2:1 ratio applied. For example, if the arm is rotated out at 90 degrees we can calculate the rotation of the scapula as follows:

Arm rotation = 90
Minus first 30 degrees = 60
Ratio of arm rotation to scapula rotation is 2:1, therefore:
60/2 = 30 degrees of scapula rotation

This is a general principle that can be verified by observation. Note, however, that it is possible to see some asymmetry in this movement between one side of the body and another. This is something to look out for more generally, as human bodies are not diagrammatically uniform.

To simplify: the shoulder girdle movement is directly a part of what the arm does, which is why I often think of the clavicle as the third section of the arm, as if the arm begins at the pit of the neck. This helps us to see how the limbs move in relation to one another in terms of balance. Here, it also suggests something like the mechanics of a bird's wing, as mentioned above in relation to the pectoralis muscle.

Similarly in the back view, we are really considering the scapula as a part of the arm, and so trying to understand how the limbs interlock with the torso. We then consider the muscles that attach to the bones, and where we can feel how they might be dragged as these skeletal landmarks move. This

is one of the more complex examples of articulation and muscular deformation in the body, but an understanding of this greatly increases your sensitivity to the way in which the limbs are embedded deeply into the structure of the thorax.

Spinal Muscles Construction

The reality of the spinal muscles is extremely complex, but in terms of surface form they can be simplified quite readily. Essentially, these muscles can be grouped into two substantial tubular forms arising from the sacrum, and the rear portion of the iliac crest. They present a convex rounded surface either side of the spinal furrow. We will see more about how these forms relate to other muscles of the back below.

Key Muscles of the Upper Back and Shoulders

Trapezius

The trapezius is a large and complex muscle. Its thickness varies a great deal throughout, thin in some places, thick in others. The primary sites of attachment that we need to think about are at the base of the skull, to the lateral third of the superior border of the clavicle, and along the spine of the scapula. The contour formed by the section of the muscle that runs from the clavicle to the base of the skull makes the distinctive line of the shoulders and neck. There is a subtle twisting of the fibres along this area, and the muscle is substantial and thick, distinctly 'pinchable' at this point. Moving downwards from here, it becomes thinner, and ends in a 'tail' on the centre line of the spine below the bottom level of the scapula. The overall shape of the muscle could be contained within a diamond-shaped envelope.

Study of this muscle teaches some good lessons about the effect on surface form of the relationship between muscle and tendonous tissue or aponeuroses. There is a diamond- or ovalshaped aponeurosis at the point of the landmark of the seventh cervical vertebrae. There is also an area of aponeurosis at the corner where the medial border of the scapula and the spine of the scapula meet. Finally there is a small segment of aponeurosis at the end of the 'tail' of the trapezius, which truncates the pointed end of the muscle. All these areas of aponeurosis create areas of neutral form, or flat planes, around which the fleshy fibres of the muscle gather.

The directions of the fibres of the trapezius are also important to note, as they give an understanding of the direction of pull of which it is capable.

Teres Major

This is a very important muscle in terms of surface form. It originates from the lower lateral border of the scapula, and inserts into the humerus. This muscle, along with the latissimus dorsi, forms the back wall of the armpit. When the arm is raised or stretched, the teres major can become quite

stretched. When the arm is at rest, or pulled in towards the centre line of the back, it can become quite bulbous.

As you can tell from the structure of these chapters, the initial emphasis is on skeletal forms as being critical. However, when observing the live model it can sometimes be unclear as to where skeletal landmarks actually are, and this is where a knowledge of the musculature can help. For instance, it is sometimes unclear exactly where the lower extremity of the scapula is. Looking instead for the teres major muscle gives us that location when it is not apparent in any other way. The teres major is also going to be an important muscle from the point of view of understanding the way in which the arm interlocks with the shoulder, especially the interchange between teres major and the long head of the triceps.

Teres Minor and Infraspinatus

Like the teres major, these muscles run from the scapula to the humerus. Again from the point of view of surface form, these two muscles can be grouped. Filling in the space between the teres major, the trapezius and the deltoid, the terrain is comparatively uneventful, forming a neutral, flat plane, though it can have a degree of fullness.

Rhomboids

The attachments of this muscle, in simple terms, originate from the centre line of the spine from the first to the seventh vertebrae, inserting into the spinal border of the scapula. Thicker lower down, thinner higher up, this muscle helps to draw the shoulder blades in to the centre line of the back, and also helps to raise the shoulder. It can be thought of as working in opposition to the serratus anterior muscle.

When the arms are at rest, this muscle is in large part covered by the trapezius and latissimus dorsi. More of its surface is exposed when the shoulder blade rotates outwards and up. When the arm is pulled out and around to the front of the body, the rhomboid is flattened and stretched thin. Conversely, when the arm is pulled in to the centre line of the back, the rhomboid can become very plump, and its surface form is distinct despite not being on the upper layer.

Latissimus Dorsi

This muscle helps to draw the shoulders back and in towards the centre line of the back. Originating from the posterior third of the iliac crest and from the spine to around midway up the rib cage, this is another muscle whose volume is variable throughout its mass.

The muscle inserts into the upper portion of the humerus, towards the front, and so combines with the teres major to form the back wall of the armpit, or axilla, where it is at its thickest and most substantial. From this point the muscle has a border that runs horizontally, over the bottom angle

of the scapula, holding it on to the rib cage. This border is overlapped by the ‘tail’ of the trapezius, described above.

At the bottom of the muscle’s dimension there is a large area of aponeurosis that starts from the posterior superior iliac spine, and rises up to a point where it is no longer visible at the level of the lower angle of the scapula.

Muscles of the Arm, Forearm and Hand

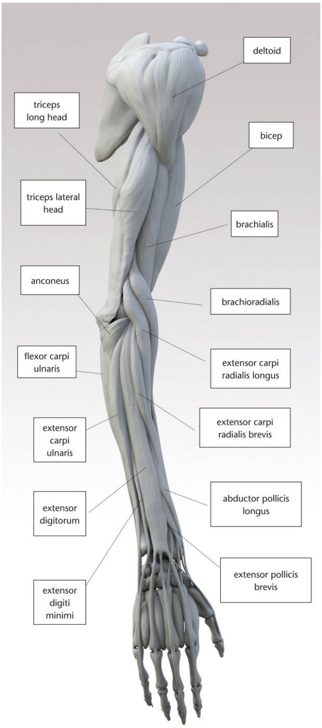


Fig. 128 Muscles of the arm, outside view.

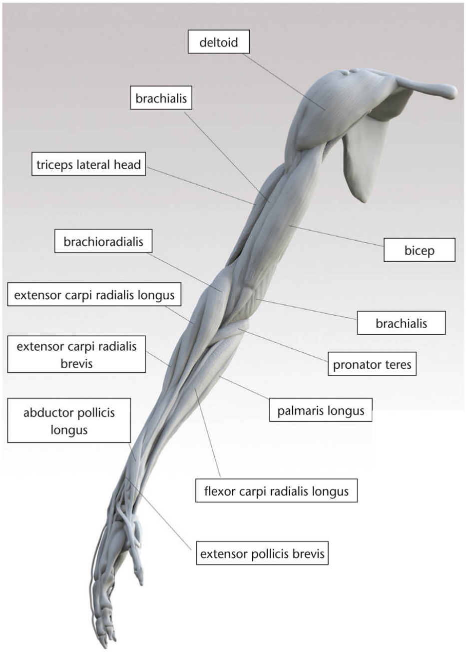


Fig. 129 Muscles of the arm, front view.

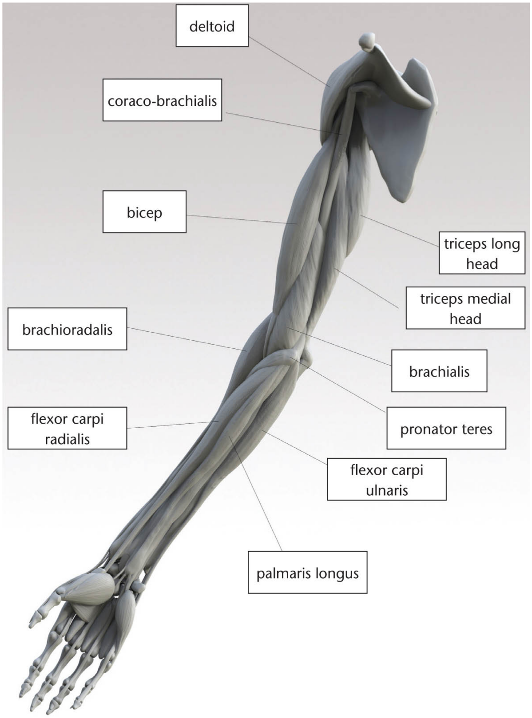


Fig. 130 Muscles of the arm, inside view.

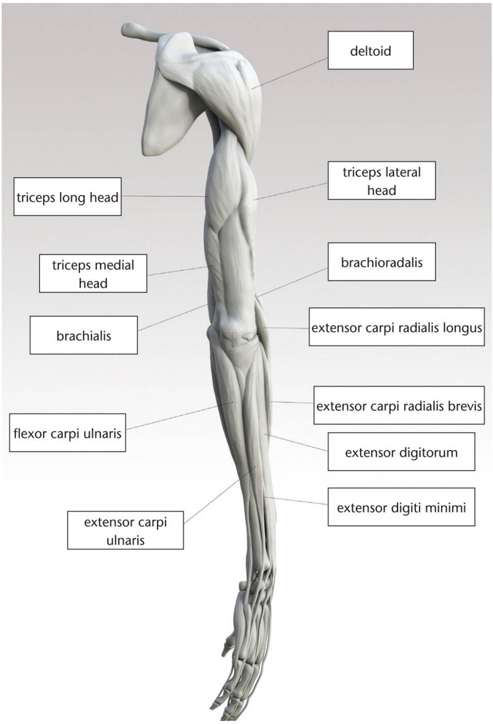


Fig. 131 Muscles of the arm, back view.

The Upper Arm

Deltoid

This is a key muscle of the shoulder and upper arm, and is often over-simplified. It originates from the exterior third of the clavicle, and also from the spine of the scapula. There is a small triangular area of aponeurosis which begins at the angle of the medial border of the scapula and the spine of the scapula, creating a neutral flat plane.

The body of the muscle can be divided into three sections. The middle section springs from the acromion process of the scapula. The fibres dive down to the insertion point on the humerus, and form the 'tail' of the deltoid. The fibres of this portion are organized irregularly, creating a variety of possible striations. The front, or clavicular portion, emerges from the exterior third of the clavicle and tucks under the tail of the middle section of the muscle. The posterior head of the deltoid emerges from the spine of the scapula, and, like the clavicular portion, tucks under the insertion point of the middle section. The divisions between the three sections are often visible at the points where they attach to the scapula and clavicle.

The muscle attaches by way of very short aponeuroses, and it is possible to observe deeper grooves in the striations of the muscles at distinct points

between the heads.

The muscle functions in the elevation of the arm. The deltoid is only capable of raising the arm to a horizontal position – any more elevation requires the movement of the scapula and clavicle, and the beginning of the scapulo-humeral rhythm.

Triceps

As the name implies, this muscle is composed of three portions, or heads. Its insertion point is via a common tendon into the olecranon, or the point of the elbow. It originates from several points: close to the socket of the scapula, and from the upper and lateral surfaces of the humerus. It helps to understand the construction of the common tendon arising from the olecranon, which forms a distinct plane on the rear of the upper arm. It is four-sided, angled towards the outside of the arm, ending in a point at the top – see diagrams for more on this.

Above this we see the sometimes bulbous masses of the lateral head and the long head. The lateral head attaches to the humerus, whilst the long head dives in between the teres major and the infraspinatus to find its attachment on the scapula. The medial head is to be found on the lower part of the inside of the upper arm, and contributes to the character of the overall muscle as being that of a skewed quadrilateral form.

This muscle varies in its character a great deal according to body type. On highly muscled figures the heads of the triceps can be quite bulbous, taking on an onion-like contour. On a slim female body, however, barely any of the above distinctions may be visible: the overall muscle can appear as a unified surface – a thin, vertical slice of a cone on the back of the arm which tapers towards the elbow, and not much more than that. However, the points of insertion and interchange, such as where the deltoid inserts against the triceps, will be visible as nuances of contour, with one form crossing another. In short, this observation reinforces the importance of understanding the body as simple volumes wherever possible.

Biceps

The bicep brachi means ‘two-headed muscle of the arm’. The conventions of Latin naming associated with anatomy are not a necessity for learning to draw, though they are for communicating and teaching anatomy. It can help with more advanced study to know some of the logic of the terms: in this case, ‘bi’ means ‘two’, and ‘brachi’ means ‘arm’. The biceps muscle is probably one with which we are most familiar, yet its structure may be more subtle and complex than it first seems.

The muscle is made up of two heads, the long and the short head. The origin is from the surface of the glenoid cavity (the ‘socket’ of the scapula into which the head of the humerus plugs) and the protrusion of the coracoid process, also a part of the scapula. This is a small bony prominence resembling a crooked little finger, or coat hook. The heads of the biceps come together to insert into the radius on to a small tuberosity on the end of

the bone nearest the elbow, its proximal end.

In cross-section, the fleshy body of the biceps is not simply circular, although this sense of an elongated cylinder will work well as an initial simplification. As we refine our drawing, we can say that the cross-section is narrower towards the front and wider towards the back. All of this assumes that the arm is at rest, hanging by the side of the body.

The action of the biceps is primarily to flex the forearm. In highly developed individuals, strong flexion makes the biceps into a ball-like form. However, the form of this muscle is one that is highly variable in terms of different individual physiques, and it can vary from the large bulk of the ball-like mass just mentioned, to quite a slender tube.

Brachialis

The biceps are supported by the brachialis muscle, which is attached to the humerus, finding its way to insert into the ulna. This muscle acts as a kind of ‘bed’ for the biceps, and is often visible on an outside view of the arm. In terms of its function, it assists the biceps in the flexion of the arm.

Coracobrachialis

This is a small, elongated sausage of muscle which originates from the coracoid process of the scapula, and inserts into the middle third of the humerus. In terms of construction, it becomes important when dealing with the arm in a raised position, as it can significantly form the structure of the axilla or armpit: it is a distinct form, for example, in many paintings of the crucifixion.

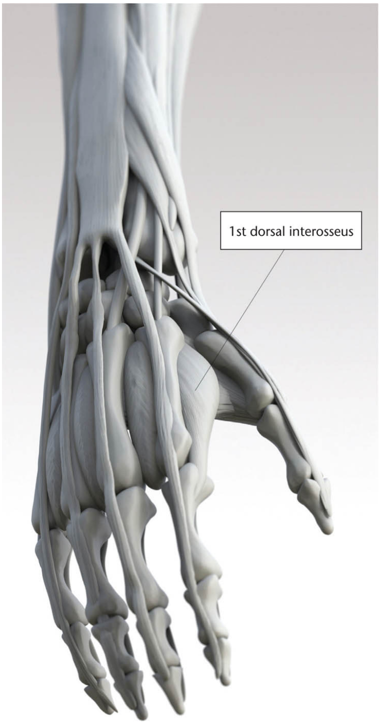


Fig. 132 Structure of the hand, dorsal view.

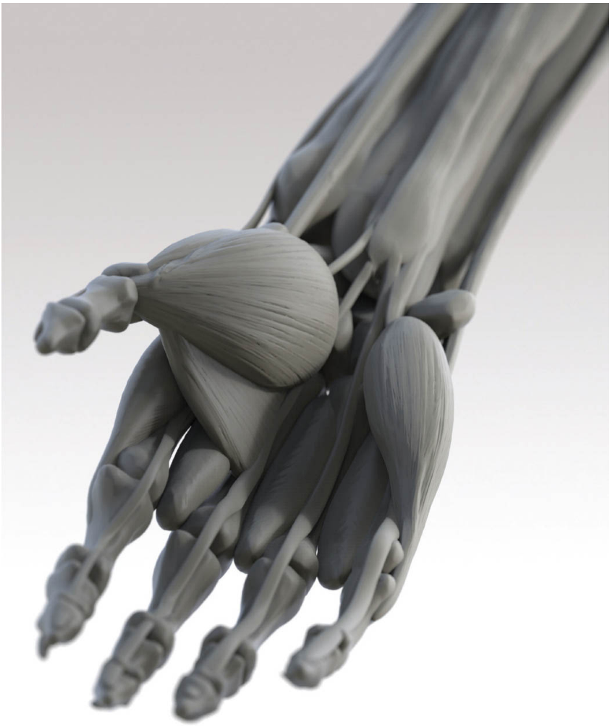


Fig. 133 Structure of the hand, palmar view.

The Forearm

As far as construction and mechanics go, the forearm is arguably the most complex area of human anatomy, and the most difficult to understand. For a start, there is just so much to comprehend: we are talking around twenty muscles in this one small area. Add to this the range of motion that is possible in the forearm, and we find that this bewildering array of muscles is subject to variation as the hand is flipped from palm facing up, to palm facing down. These movements are referred to respectively as supination and pronation. This action takes place when the radius rotates upon its long axis, pulling the hand with it at the connection formed by the head of the radius and the thumb side of the hand.

That said, there are many useful, broad simplifications that we can make. The first is that, if we take the forearm as a whole, we can say that the form of the upper half is primarily made up of muscle, whereas the form of the lower half is primarily made up of bone. Secondly, and related to this fact, we can use our vocabulary of geometric solids to describe what is going on more clearly, and say that the upper portion of the forearm is somewhat cylindrical, whereas the lower portion is more box-like. Thirdly, we can split the many muscles into groups, which we can then treat as masses in

themselves, so nuancing our initial simplified forms.

Perhaps the best way of approaching the study of this complex area is to accept that it really is a different beast in terms of complexity, and to allow for this in the time that we give to it. The forearm could be said to be as complex as the torso taken as a whole, and so to require a similar investment of study.

We will break down the complexity of the forearm by thinking in 'bundles', and can divide the forearm muscles into three groups: the radialis group, the extensors, and the flexors.

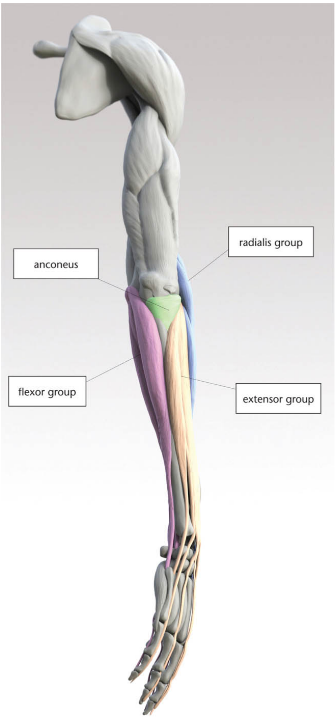


Fig. 134 Muscles of the forearm, grouped.

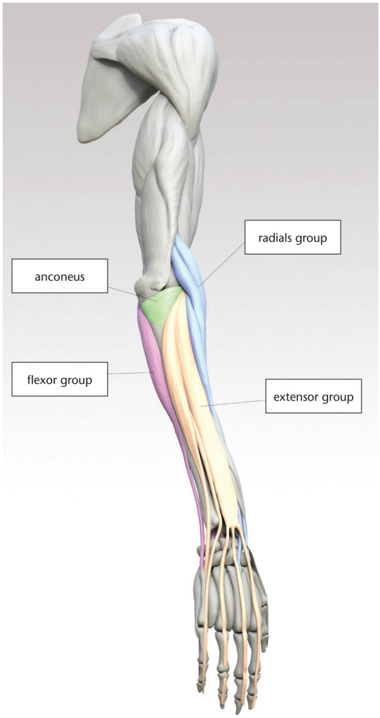


Fig. 135 Muscles of the forearm, grouped.

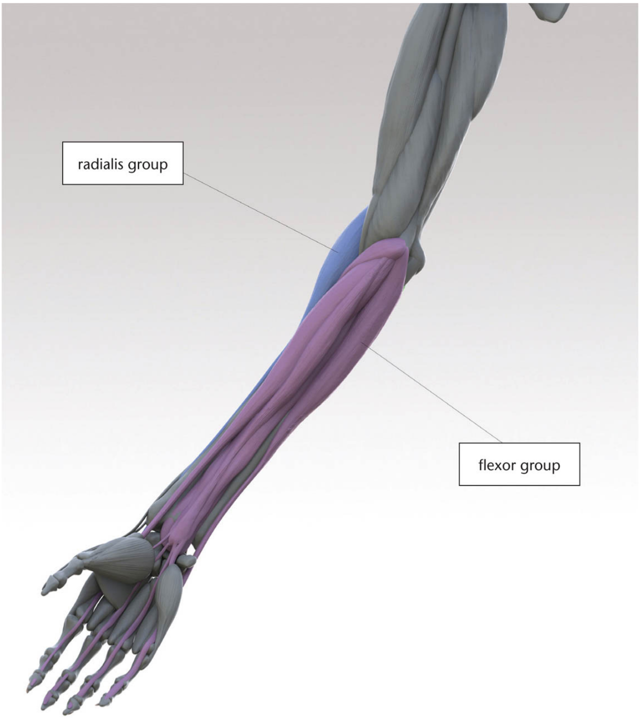


Fig. 136 Muscles of the forearm, grouped.

The Forearm Extensors: Radius Group and Extensor Group

Radius Group

In bundle number one we will group muscles with form as a priority, rather than function. Looking at the dorsal side first, we can begin with a pair of muscles that generally present themselves on the surfaces as one form, the brachioradialis and the extensor carpi radialis longus. The brachioradialis is technically a flexor, but for our purposes we will consider it as twinned with the extensors. We can add to this the extensor carpi radialis brevis.

The first two muscles together are sometimes referred to as the 'ridge muscles' due to their emerging from the ridge-like outer edge of the lower part of the humerus. As always, and particularly with long muscles, we want to think initially of the relationship between the origin and insertion points as a vector, or straight line between two clearly understood bony landmarks. In the case of the brachioradialis, the vector runs from the outer edge or the lower part of the humerus, down to the base of the styloid process of the radius. It thus has a sort of 'over and under' quality when the palm is facing down.

The extensor carpi radialis longus emerges just below the brachioradialis on the humerus, and inserts into the dorsal (back of the hand side) base of the second metacarpal. It is worth dwelling for a while on these two muscles,

as understanding these can make the task of assimilating the rest of the forearm structures much easier.

The images show these muscles in ecorche form, and we can observe what happens to them when the forearm moves through its various states of supination to pronation. In particular, observe the way that these muscles help to bridge the forms of the lower and upper arm. At all times we want to find and emphasize the ways in which one body part interlocks with another.

Finally we will include as a part of this group the extensor carpi radialis brevis, which moves from its origin to the dorsal surface of the base of the third metacarpal. This makes our first bundle in the forearm's muscular structure.

Identification

radius = thumb side
ulna = little finger side

Extensor Group

Bundle two consists of three muscles: the extensor digitorum, extensor digiti minimi, and the extensor carpi ulnaris. All three of these muscles originate from the lateral epicondyle of the humerus. This bony landmark is something like a hub for these three muscles, which successively spring from its surface. Thus the extensor digitorum makes its strap-like way to the back of the hand, where it divides into tendons for each of the four fingers, and the extensor carpi ulnaris shoots down to the base of the head of the fifth metacarpal. This insertion is via a clearly visible tendon on the little finger side of the head of the ulna, and it contributes to the wrist's box-like quality.

Extensor Digiti Minimi

A detail not to be missed is the form of the extensor digiti minimi, which on well developed musculature does appear on extension of the little finger. It can be seen in much classical sculpture. It emerges between the extensor digitorum and the extensor carpi ulnaris, and so can be thought of as an occasional 'interruption' to bundle two.

The Forearm Flexors

The forearm flexors can be grouped together, making up 'bundle three' of our forearm muscles. This bundle consists of the palmaris longus, flexor digitorum profundis and superficialis, and the flexor carpi ulnaris, and we will include the pronator teres here too. These can be thought of as one mass originating from the medial epicondyle of the humerus, driving slightly obliquely down towards the hand. Becoming tendon at the wrist, they account for our earlier simplification of the forearm as fleshy in the top half,

and bony/tendinous on the bottom half.

Detail Muscles

Anconeus and Pronator Teres

The anconeus is a small but important muscle in the design of the arm. Originating from the lateral epicondyle of the humerus and inserting into the posterior surface of the ulna, the oblique form of this muscle presents a key aesthetic disruption to the long axis of the arm, as well as accentuating aspects of the interlocking nature of the surrounding muscles.

Pronator teres originates from the medial epicondyle of the humerus and inserts into the middle of the lateral surface of the radius. As the name implies, this muscle helps to pronate the arm, and is of a thin, sausage-like form. Its mass contributes to the 'V'-shaped cavity at the crook of the elbow, into which the brachialis and biceps muscles insert.

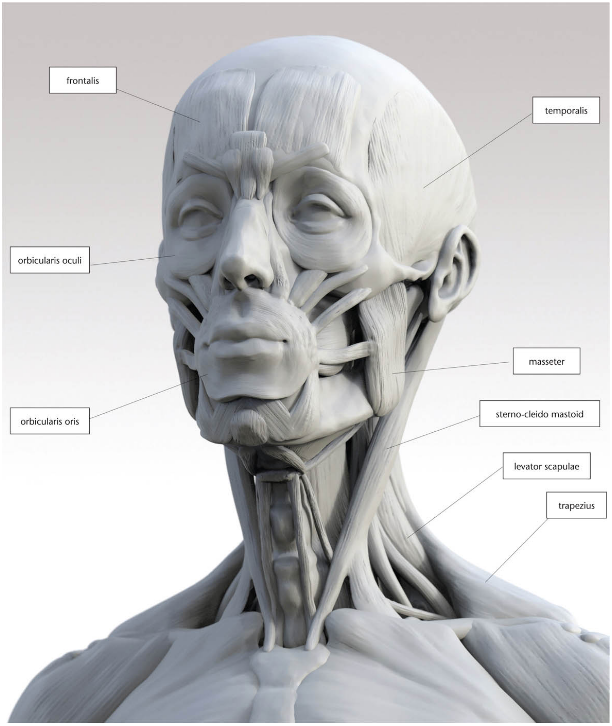


Fig. 137 Muscles of the head and neck.

CHAPTER 6

MUSCULATURE OF THE LOWER BODY

Muscles of the Pelvic Region

We will continue to approach the musculature in regions, and to group them where necessary. In this section we consider the pelvic region, and three muscles in particular: the gluteus medius, gluteus maximus and the tensor of the fascia latae. There are many deep muscles in this region that contribute in complex ways to the building out of surface form. However, we shall leave them to one side here and concentrate on those most critical to approaching an understanding of the surface form.

That said, it is worth noting something about what the layers of muscle do to the skeleton. In effect, what we are dealing with is something like an object (the pelvis) being 'wrapped' or padded, such that what we are presented with in the live body is an echo of the bony form. This is true in the figure generally: the arcs, sweeps and angles of the skeleton are present in the live body, and many of its structures are discernable in attenuated form with, as we have established, certain critical landmarks being subcutaneous, or just under the surface of the skin.

Fig. 138 General view of the lower body musculature from the front.

Fig. 139 General view of the lower body musculature from the back.

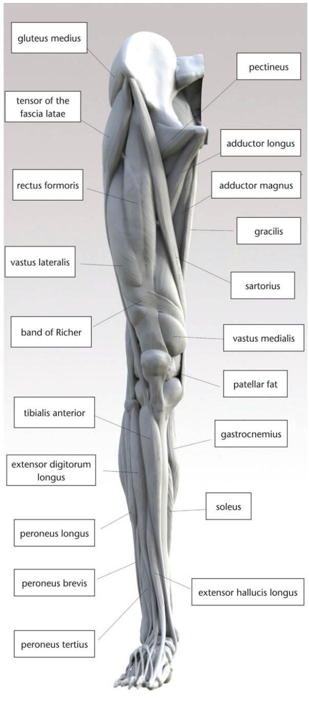


Fig. 140 Muscles of the leg, front view.

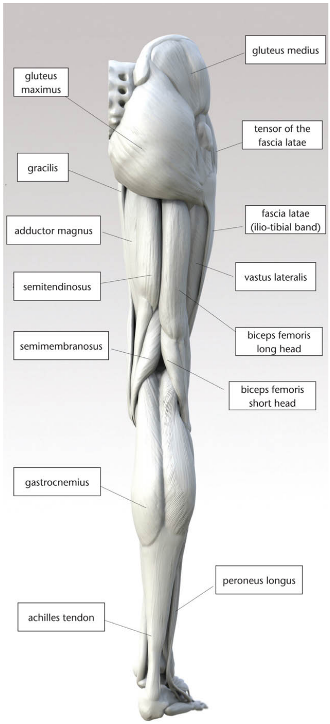


Fig. 141 Muscles of the leg, back view.

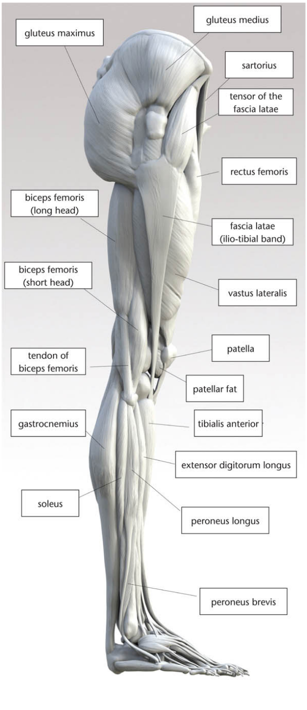


Fig. 142 Muscles of the leg, outside view.

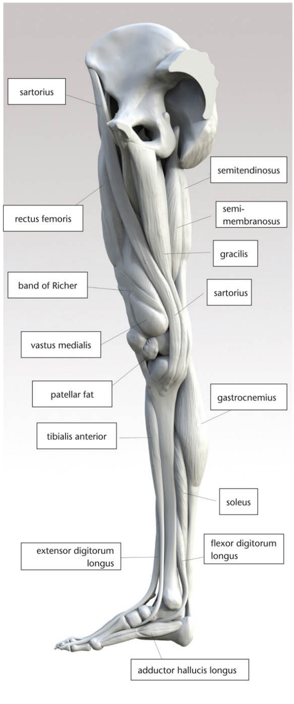


Fig. 143 Muscles of the leg, inside view.

Fig. 144 Structure of the foot, inside view.

Fig. 145 Structure of the foot, outside view.

Gluteus Medius

This muscle originates from the front three-quarters of the iliac crest and inserts into the great trochanter of the femur. Its fibres radiate outwards from the great trochanter, and its overall form could be characterized as a fan or scallop shell shape. There are some subtleties and complexities as to how this muscle, and others in this region, join to the surrounding aponeuroses. This can make things difficult to read in this area as there is some blending of forms.

The function of this muscle is varied, and depends on what section of the muscle is activated. The front group of fibres helps to rotate the thigh inwards, and the middle portion to abduct the thigh. Remember: to abduct means to move away from the centre of the body, to adduct means to pull back in. The gluteus medius also plays a general supporting role, stabilizing the position of the pelvis.

Aponeuroses and Fasciae

The term ‘fascia’ describes the material that covers all muscles: a tough and taut film of white tissue that might be thought of as a kind of stocking. Whilst allowing

muscles to move individually within it (and so being something like a sheath), this material also provides a stabilizing and binding quality that helps muscles to work together. This material varies in thickness in various parts of the body, and in places affects the surface form in important ways.
Aponeuroses are layers of flat, broad tendon which join muscles to the part of the body on which they act. At times, muscles can insert directly into an aponeurosis, rather than the usual case of going from bone to bone. A case in point is the tensor of the fascia latae, which inserts into the iliotibial band.

Gluteus Maximus

The gluteus maximus originates from the posterior part of the ilium and from the external border of the sacrum. It inserts into the centre line of the femur about a third of the way down. This muscle also inserts into the femoral aponeurosis.

Tensor of the Fascia Latae

This muscle originates primarily from the anterior superior iliac spine (ASIS). It inserts into the ilio-tibial band, which ends at the head of the tibia, attaching to a bump known as Gerdy's tubercle. The fleshy part of this muscle is like a short, tapered tube in form, and reaches down just below and in front of the great trochanter. Because this muscle inserts into the ilio-tibial band – which in turn blends with the surrounding fascia – its inferior termination can sometimes be ambiguous.

The function of the tensor muscle is to flex the thigh, but it also aids in rotating the thigh medially. Its form can be very pronounced in some subjects when the thigh is flexed towards the torso. It also forms a significant part of the contour of the pelvic region and so is an example of a muscle that, while unfamiliar to most of us and relatively minor in function, is very important in terms of surface form. We will consider this area in more detail in Chapter 7.

Sartorius

Originating from the anterior superior iliac spine (ASIS), the sartorius is the longest muscle in the body and spirals down from the ASIS to its insertion into the medial surface of the tibia, thus contributing to the fullness at the inside of the knee. Flattened in form and about two fingers in width, its function is to flex the thigh as well as to rotate it laterally. It can also aid in medial rotation.

Organizing Function of the Tensor and Sartorius Muscles

In terms of form and structural organization, the sartorius and tensor muscles play an important role. Both originate from the ASIS, but shoot

away from it in different directions. They thus create a cavity that is something like an upside-down V shape. It is from this cavity that the rectus femoris will emerge as it makes its way out from its origin just below the ASIS, as is explained below. The sartorius also forms an oblique bounding line running from the ASIS to the inside knee; this boundary is also that of the quads, and forms the edge of the very characteristic teardrop shape of the vastus medialis just above the patella.

The Ilio Tibial Band

The ilio tibial band is a thickening of the general fascia of the thigh, and can be thought of as an elongated arrow-like band, plunging directly downwards towards the knee. On the live figure its presence can sometimes be seen as having the effect of lashing down the vastus muscle of the outer thigh, and so presenting as a subtle linear indent. Its inferior end, where it joins to the tibia, is sometimes confused with the tendon of the biceps femoris, so it is good to be aware that we are looking for both when we see an outer view of the knee. From the point of view of drawing, these are relatively minor forms. However, their importance lies in providing cues for us to read the flows of musculature in the region, and they are a valuable tool in doing the detective work of trying to understand how musculoskeletal structure presents itself as surface form.

Muscles of the Upper Leg

The upper leg presents us with a fair bit of complexity, so it is worth attempting to summarize and simplify. We will therefore divide the upper leg into regions: the quadriceps group, the adductor group, and the hamstring group.

The Quadriceps Group

Ordinarily referred to as the ‘quads’, and therefore made up of four muscles, the quadriceps group makes up the form of the front of the thigh. For our purposes, only three of the muscles create the major form: rectus femoris, vastus lateralis and vastus medialis. Vastus intermedius is relatively minor, so its presence is a subtlety for us.

Rectus femoris

The origin of this muscle brings us to an important detail of the pelvis. We have established the anterior superior iliac spine (ASIS) as a major landmark. However, this muscle primarily originates from the anterior inferior iliac spine, just below the ASIS. For our purposes we can consider its insertion to be into the tendon of the patella.

Vastus Lateralis and Vastus Medialis

Vastus lateralis originates from the great trochanter, and vastus medialis from the linea aspera; both insert into the patella tendon.

Overall Form and Disposition of the Quadriceps

As explained above, the rectus femoris emerges from the gap formed in between the tensor and sartorius muscles, whilst the sartorius also forms the medial limit of the quads at the knee. The vastus lateralis is the largest member of the quad group and is responsible for the volume of the entire exterior of the thigh. It attaches to the patella tendon at a point above the patella that is almost equal to the height of the patella itself.

Vastus medialis, by contrast, inserts into the patella tendon at a point just below the middle of the patella. There is thus an oblique quality to the fullness of the lower portion of both muscles: higher on the outside, lower on the inside. The vastus medialis forms a teardrop/egg-like mass on the upper part of the inside of the knee. This form is contained by the border of the rectus femoris on one side, and the boundary of the sartorius on the other, as previously mentioned.

Vastus intermedius is the deepest of the four muscles – it presents itself as an ovoid swelling at the exterior of the knee when the leg is flexed.

The Adductor Group

The adductor muscles are another example of where it makes sense from a drawing point of view to group several smaller muscles into one large mass. Not only does this make our job easier and keep our attention focused on what matters and on what we are doing, it also explains why the study of anatomy can present the difficulties that it does. Many who have attempted to study anatomy from the point of view of drawing the figure find that the diagrams of the musculature most readily available, however good, can often end up confusing matters in the beginning. This is because each individual muscle tends to be itemized and illustrated separately, rather than being grouped in terms of their significance as form.

The adductor group is composed of the following muscles: pectineus, adductor longus, adductor brevis and adductor magnus. Together they form a single mass on the inside of the upper thigh. The upper part of this mass attaches to the underside of the pelvis from front to back, so from the pubis to the ischial tuberosity. The mass tapers down into the femur, attaching to the linea aspera and the inside condyle of the head of the femur.

To conceptualize this mass, imagine a fairly long and slender cone with its point facing towards the ground. Then imagine this form sliced down the middle lengthways. One of he resulting segments, if placed on the inside leg with its flat surface placed against the femur, would give a fair starting point to imagining the nature of the form of the adductor mass.

Remember, to adduct is to pull back in towards the centre of the body, which is precisely the action of this group – although these muscles do also assist in rotation of the thigh.

The Gracilis

The gracilis is another muscle that contributes to the form of the inner leg. This is a long muscle, similar to the sartorius. It originates from the pubis and makes its way down to the crest of the tibia. It is important to note that it first moves on a diagonal towards the back of the body before curving back towards the front and its attachment to the tibia. It is wider at the top and thinner at the bottom. Its insertion at the tibia contributes to the fullness at the inside knee, and it influences the silhouette of the inner leg when seen from the front and the back. Its function is primarily as an adductor.

The Hamstring Mass

Biceps Femoris

As the name implies, we can see this muscle as analogous to the bicep of the upper arm, and as such consists of two sections or 'heads'. The primary origin is from the ischium of the pelvis, though also from the linea aspera of the femur. The insertion is by tendon into the head of the fibula. The biceps femoris makes up one half of the hamstring mass, and the rest is created by the next muscles, the semimembranosus and the semitendinosus muscles.

Semimembranosus

Semimembranosus also originates from the ischium, and inserts via a fairly complex tendonous expansion into the media condyle of the tibia. The muscle forms a sort of 'bed' for the semitendinosus in the same way that the brachialis does for the bicep of the arm. The lower part of the semimembranosus presents a fullness at the back of the knee, which can be quite visible.

Semitendinosus

Like the biceps femoris, this muscle also originates from the ischial tuberosity of the pelvis – an example of a key part of the skeleton that is not visible on the surface, but necessary to understand in order to be clear about muscular structure. The semitendinosus inserts into the crest of the tibia, and as such contributes to the fullness of the inside knee. The muscle contributes variously to extension and flexion of the lower limb, as well as the rotation of the thigh.

Border Muscles

Sartorius

After the complexity – soon to be simplified – of the thigh muscles, the sartorius provides some welcome clarity. It is the longest muscle in the body, and one of the most spectacular in terms of its striking rhythm. It performs

an important organizing function in that it provides a border between the planes of the quadriceps group and the adductor mass. Originating from the anterior superior iliac spine (ASIS), it inserts far below into the medial surface of the tibia. Its width is that of about two fingers. It is best imagined by visualizing a straight vector from the ASIS to the inside knee, which is then bent forwards at the top and back at the bottom to form an S-curve. Its function is to aid in flexing and rotating the thigh.

Linea Aspera

This is a ridge on the back of the femur, running the length of the bone, and can be thought of as a raised centre line.

The upper leg can be expressed well with these simple masses: quads, adductors and hamstrings. There will be more on the organization of muscular form in Chapter 7.

Summary of the Upper Leg

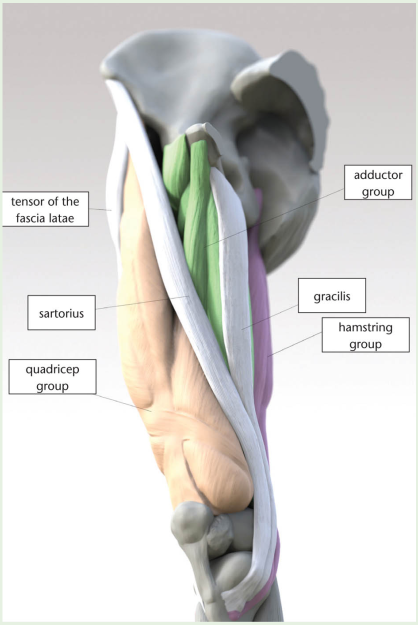


Fig. 146 Muscles of the upper leg, grouped.

The upper leg presents us with a fair bit of complexity, so it is worth attempting to summarize and simplify. We will divide it into regions: the pelvic muscles, the quadriceps group, the adductor group, and the hamstring group.

The Quadriceps Group

We can group together the rectus femoris, vastus lateralis, medialis and indermedius. It

is easiest to think of the vastus muscles first, as they function as a bed for the rectus femoris. These can be reduced to a large teardrop shape, beginning at the great trochanter and swinging down towards the knee. On the inside, this group reaches over as far as an imaginary diagonal line running from the ASIS to the inside of the knee (the path of the sartorius). On the outside, the vastus muscles take up the exterior view of the leg and abut the hamstring group on the back. The rectus femoris sits on top of all of these and runs down the middle, originating from the anterior inferior illiac spine.

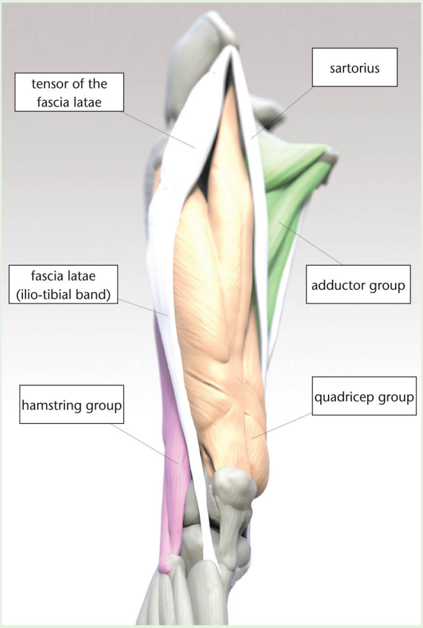


Fig. 147 Muscles of the upper leg, grouped.

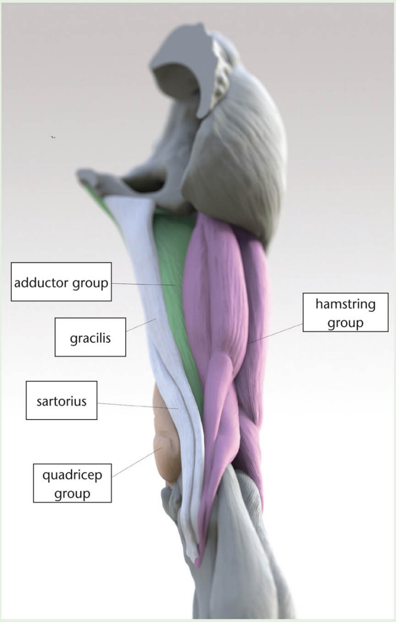


Fig. 148 Muscles of the upper leg, grouped.

The Adductor Group

There are several muscles here, which for the purposes of drawing can all be lumped together into one mass. As described above, think of a long cone sliced lengthways: one half of this is approximate to the adductor mass. It also often presents an egg-like aspect.

The Hamstring Group

Again, we can reduce the complexity here to a straightforward egg mass, culminating in two tendons that reach out like pincers to either side of knee.

Muscles of the Lower Leg

The lower leg, as with the forearm, also presents us with the job of simplifying great complexity. However, the lower leg has the advantage of not demonstrating the dynamism and deformations of the forearm movements of supination and pronation.

As per the general rule, we will approach this area by breaking down the musculature into groups, bundles or regions. On the back we will primarily be looking at the soleus, the gastrocnemius and the Achilles tendon. The inside of the lower leg is essentially bone – the medial plane of the tibial shaft is exposed along its length down to the ankle. On the front and outside we at first look at three muscles: tibialis anterior, extensor digitorum, and

peroneus longus.

The lower part of the lower limb will have the following muscles to consider: extensor hallucis longus, peroneus brevis and peroneus tertius. As with the forearm, the upper half of the lower leg is primarily muscle, the lower half primarily tendon and bone. The gastrocnemius, soleus and Achilles tendon can be broadly grouped; the closest analogy would be with the triceps of the upper arm, and in fact this lower leg grouping is known as the triceps surae.

Triceps Surae

This grouping consists of soleus, the two heads of gastrocnemius, and a small muscle called plantaris. For our purposes we can integrate the plantaris into the form of the gastrocnemius.

Soleus

This is the deeper part of the group. A rather flat muscle, it connects to the head of the fibula and also joins to the Achilles tendon, which itself drives into the calcaneus, or heel bone. Its basic vectors form an oblique diamond shape, its two ends on a diagonal axis between calcaneus and fibula, and the horizontal points on a diagonal that is higher on the outside of the leg, and lower on the inside.

Gastrocnemius

This muscle consists of two heads, the lateral and medial. The lateral head is relatively flat, the medial is much more bulbous, and reaches around the inside of the shin further towards the front. Both heads each tightly attach to the condyles of the femur, creating a furrow between them – though this is obscured in the living figure by fatty tissue and is rarely seen except on very lean individuals, or in high exertion. Overall the gastrocnemius can be thought of as amplifying the form of the Soleus, and it, too, terminates lower on the inside leg and higher on the outside.

Achilles Tendon

This tendon is like a cylindrical cable in extraordinarily high tension. An anatomical point of interest is the fact that there is a fairly substantial gap between the tendon and the rear of the tibia and fibula. This is accounted for by the way that the calcaneus extends backwards, and so allows the lever-like movement of the foot. The triceps surae are essentially extensors of the foot.

Tibialis Anterior

This muscle originates from the upper two-thirds of the body of the tibia, to the one side of the 'blade' of the shin. Halfway down the shin it turns into a tendon which shoots diagonally down and wraps under the foot, attaching to the first metatarsal. The muscle body is substantial, and helps to fill out the concavity underneath the tibial plateau. The tendon is more loosely held to the bone than others in the region, and so can be distinctly visible when contracted. The action of this muscle is to flex the foot.

Peroneus Longus and Peroneus Brevis

These two muscles can be treated together. Peroneus longus originates from the upper part of the fibula, and also from the connective tissue which fills the space between the fibula and tibia. About halfway down the tibia it turns to tendon. This tendon loops behind the malleolus of the fibula and connects to the underside of the fifth metatarsal.

Peroneus brevis is attached to the lower portion of the fibula, and also ends in a tendon which ends at the tuberosity of the fifth metatarsal. Together they effectively sheath the fibula, meaning that its presence on the surface of the body is only felt at its head and at its lower extremity, the outer ankle. Peroneus longus sits atop the brevis. Their muscular bodies are elongated, and there is a subtle break in the contour where longus ends and brevis becomes visible.

In the front view, the brevis can add a very subtle fullness to the contour of the outer lower leg, which, when drawing, prevents the appearance of that region seeming as if made only of bone.

Extensor Hallucis Longus

This muscle is an extensor of the big toe, and is largely hidden beneath the two preceding muscles. Its bottom half appears where those two muscles diverge, and its tendon drives towards the base of the second phalanx of the big toe. In terms of form, it can be considered a filler muscle.

Peronius Tertius

This muscle can also be considered a filler, emerging as it does from between peroneus longus and extensor digitorum

Flexor Digitorum Longus

Similarly, this muscle peeps out from underneath the soleus on the lower inside of the lower leg, and can have a minor modifying role in our conception of the contour of the leg at this point.

Muscles of the foot

As with the hand, the form of the foot is primarily bone, with a thick layer of very tough, fibrous fatty tissue on its underside. There are some muscles to consider, however, though they are small in number.

Extensor Digitorum Brevis

This muscle consists of four small bundles of fibres, each ending in a tendon that heads towards the big, second, third and fourth toes. Together these four bundles form an ovoid, or egg-like mass which sits just in front of the malleolus of the fibula. Its axis is oriented obliquely across the dorsal surface of the foot.

Flexor Digiti Minimi and Flexor Digiti Minimi Brevis

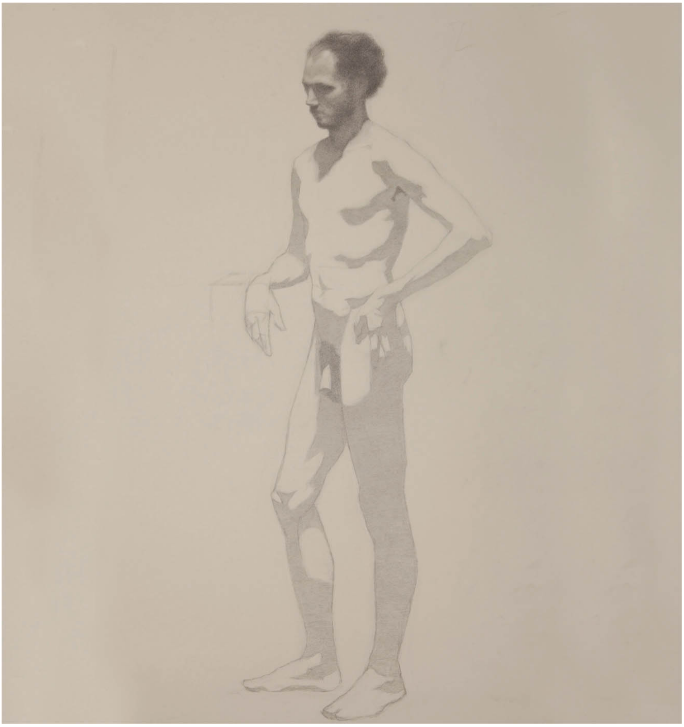
The flexor digiti minimi runs from the external surface of the calcaneus to the base of the first phalange of the little toe. The flexor digiti minimi brevis runs from the base of the fifth metatarsal into the lateral side of the first phalange of the little toe. To simplify, these muscles help to accentuate the flat nature of the outside of the foot as it makes contact with the ground, as opposed to the arch of the inside of the foot. They can be thought of as two slim, sausage-like forms, spanning the distance between the outer surface of the calcaneus to the landmark of the tuberosity of the fifth metatarsal, and from there again to the base of the little toe.

Abductor Hallucis

Originating from the medial surface of the calcaneus and inserting into the first phalanx of the big toe, this muscle helps to soften the contour of the arch of the foot.

PART 3

OBSERVATION



CHAPTER 7

ANATOMY, CONSTRUCTION AND SURFACE FORM

In this chapter we can start to consider some of the ways in which the surface morphology of anatomy varies between different bodies and also according to the various deformations caused by the body as it moves. We can also consider fat distribution and skin tissue as we look at how the musculo-skeletal form is softened in the living figure. It makes most sense to consider general surface characteristics before going on to think about movement and body types. What follows is a summary of key information.

Fig. 149 Variations in body type are important to consider. Try identifying skeletal landmarks in this and the following image.

Up to this point we have considered only the musculature and the skeleton, but these forms are significantly modified by the layers of fat and skin that surround them. To recap a little, the muscles are sheathed in a layer of tough film called fascia. Above this is the fatty layer, and then the skin. Fat is not distributed equally all over the body, but tends to gather in particular places. There is some variation between male and female in this respect, and of course, there is a large amount of individual variation. In dissection, it can be quite surprising to see the extent of the thickness of even the basic fatty layer. The fatty layer can attenuate and soften the forms of the flayed figure, and it can also accentuate prominences that are already there on the flayed figure. In addition, it can create prominences and forms of its own.

As a general rule, we can say that the fat layer is very thin at those points where we find our critical bony landmarks. Places where fat tends to gather in substantial quantities are the abdomen, the buttocks, the area of the breast and the flank. Significant deposits might gather on the back of the arms, the back of the neck, and also the cheeks of the face. This is also true of the upper outside thigh. Some cavities in the flayed figure are filled by fat, such as that between the spinal erectors and the border of the external oblique.

The area of the lower back has other modifications of fat, especially in women. This can be confusing in terms of the relation between the pelvis and rib cage. For instance, in certain views the whole area between external oblique, gluteus medius and gluteus maximus can be smoothed over to a very great extent, making it hard to judge the position of the bony structures. There is another kind of fatty tissue that is underneath the fascia layer, and that serves to fill other voids and cavities in the flayed figure though this is generally less significant in terms of surface form, with the exception of fat under the patella and under the cheekbone.

Skin is, of course, another factor, presenting us with an uninterrupted surface that is tight to the bone at the skeletal landmarks, and looser at points of flexion in the body. This means we have certain folds and wrinkles which are rather consistent from person to person: the wrinkles of the palm and sole of the foot, the pubic fold, the gluteal fold, flexion wrinkles at the wrist, and so on.

Fig. 150 There is such a wide variation in anatomical structure, making this an endless subject.

Anatomical Regions

The Neck

The spine generally speaking is fairly fixed in dimensions between individuals. When somebody is tall, this is usually because of an increase in size of the lower limbs, although there are, of course, differences in scale of all the bones in larger people. What I am emphasizing here then, are those variations within skeletal structure that might account for, say, a long neck, which are in fact more due to the nature of the bones than a variation in size as such.

As we have seen, the cylinder of the neck rises out of the circle formed by the first pair of ribs, and reaches up to plug into the base of the skull. The neck is wider at this point than it is where it joins the rib cage. In terms of understanding the muscular forms more clearly, it helps to give some boundaries to the region. This is hard to do in the back view because of the sheer extent of the trapezius muscle, which reaches far down into the back. With this in mind, we should make our limits those of the outside points of the shoulder girdle – that is to say, the point where the external limit of the

clavicle joins the acromion process of the scapula. In the front, the clavicles themselves provide a clear lower boundary to the region of the neck.

In terms of how and where it attaches to the skull, in the back it is at the limit of the nuchal line. In the front we can say it is at the limit made by a line running under the jaw, from mastoid process to mastoid process. Considering that the head articulates on the first and second vertebrae – the atlas and the axis – it is interesting to note that this means that a straight line drawn from the mastoid process to the pit of the neck will be of consistent length whether the head is looking up or looking down, as this is the point of rotation itself.

In the instance of a short neck we will see that the axes of the clavicle bones are moving diagonally up to the outside. Think of this in terms of the shrugging motion we can make with our shoulders – the clavicle is fixed at the pit of the neck but can move freely at its other end. This gives the appearance of a shorter neck.

Conversely, if the clavicle is oriented obliquely and down to the outside, then more of the tube of the neck is exposed, making it appear longer. This is a variation that can happen with extreme muscular development, or with extreme obesity, where the bones themselves have to move in order to accommodate the bulk of the extra tissue.

Neck Depressions

There are some significant depressions in the surface morphology of the neck, and these often take the form of triangular gaps between the primary muscles and tendons in the area. One such is the space between the border of the sterno-mastoid muscle and the structures of the throat. Another is that referred to as the posterior triangle of the neck. This corresponds to the gap on the flayed figure between the sterno-mastoid, trapezius, and the clavicle. This is something more easily seen on lean subjects. As with all the forms in the area, it is subject to much change on account of the range of movement of which the shoulder girdle is capable.

Finally, the other significant depression is one of our key landmarks: the pit of the neck. This is made up of the space between the proximal ends of the clavicles, and accentuated by the tendonous insertion of the sterno-mastoid into the manubrium of the sternum.

The neck is very flexible, and the motions of the skull as it articulates upon the first two vertebrae are amplified by the bending and flexing of the cervical vertebrae as a whole. The chin can be brought to touch the sternum in front, straightening the cervical vertebral column; the back of the head can be brought close to the seventh cervical vertebra, amplifying the normal curve of the vertebrae.

The Torso

In the front aspect of the torso, the muscular complexity is in some ways less extreme than in other parts of the body that we have studied. However, in this region of the body we find that we are confronted with a great deal of blending of forms, as bone pushes against muscle, and as fat covers both.

The torso is in this sense anatomically relatively simple – large areas occupied by single muscles – whilst being highly complex morphologically speaking. If we consider the region of the chest, we can think about the sternum, the first five ribs, and the pectoral muscles.

The two parts of the sternum, the manubrium and the gladiolus, are on slightly different planes, and so we see a slight change in angle at the chest at the level of the manubrium. The sternal area as a whole can present as a sort of furrow, depending on the size of the pectoral muscles. The small protuberance at the end of the sternum, the xiphoid process, is very deep, and so causes a small depression, known as the epigastric depression.

Fig. 151 The torso in exertion.

Fig. 152 Muscles of the upper torso.

Fig. 153 Muscles of the back.

The area of the pectoral muscle varies a great deal depending on its development. Our ecorche model shows a slender female subject, and here we see that the influence of the form of the first few ribs is clearly detectable, and that the digitations of the muscle at this point relate to them. The contour of the clavicle muscle is softened along the first third of its length as it moves from the pit of the neck by the fact that the pectoralis attaches to its top surface. There is a distinct divot below the clavicle at the beginning of the line which separates the pectoralis from the deltoid muscle; this is known as the infraclavicular fossa.

The area of the chest becomes fattier towards the bottom of the pectoralis muscle, and in female subjects there are the mammary glands and substantial breast fat. The nipple can be roughly placed by imagining a vertical line dropped from the infraclavicular fossa, and placing it to the inside of this. They can also be positioned by running lines out from the pit of the neck at a right angle to one another. Where this line crosses the lower portion of the pectoralis can be considered a reliable marker.

The connections between the pectoralis, rectus abdominis and external oblique muscles are complicated by the way they mesh together with their surrounding aponeurosis/fascia. The underside of the pectoralis often presents a clear line or furrow, and this is due to the way the fibres connect to the fascia at that point, though they do not terminate there as such.

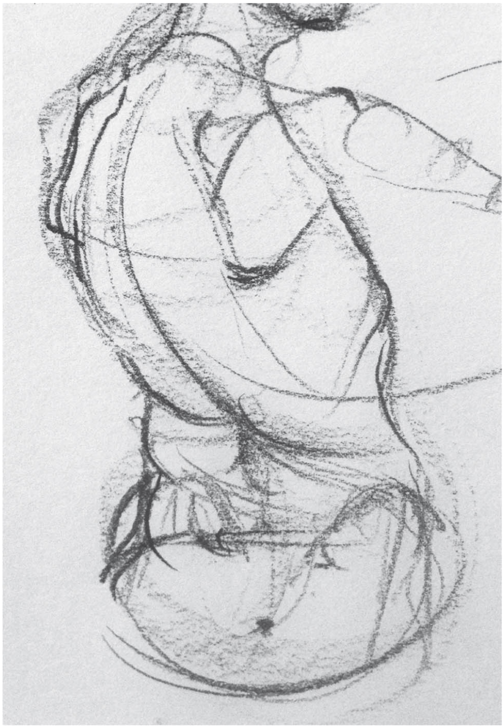


Fig. 154 Structure of the shoulder girdle.

The area below the pectoral region is worthy of special attention. The surface of the rib cage here is wrapped over by the serratus anterior, the upper portion of the external oblique, and the upper portion of the rectus abdominis. This is the area where we can find a confusing blending of muscular digitations, bony prominences of the ribs, and the protuberance of the cartiliginous structure of the costal arch. The egg or barrel-like form of the rib cage predominates, but is clad by this terrain of undulating planes. The visible digitations of the serratus anterior number three, sometimes four, and these interdigitate with the external oblique as we have seen. More can be seen when the latissimus dorsi is drawn away from them, such as when the arm is lifted up and back.

A useful way of diagnosing what forms we are seeing is to think about what the body is doing. If the rib cage is pushing forwards, with the back arched, we are liable to see the ribs and costal cartilage asserting their dominance over the digitations of the external oblique in that region – although the digits of serratus anterior tend to maintain their form more strongly. Likewise, if the trunk is compressed, the forms of the fleshy bundles of muscle fibres will be more present, as will folds created by layers of fat and skin.

Aside from action, body type is another consideration. The leaner the subject, the more we will see the muscles take on a sleek character,

efficiently connecting between skeletal points. The forms of this and of the body can change like the weather, so careful observation is key.

The forms of the rib cage in the back are also very much a question of layers. The superficial muscles, such as the trapezius and latissimus dorsi, occupy a large surface area. They are, however, quite thin, and so we need to pay attention to the deeper layers of muscle, such as the rhomboids, which are between the shoulder blades, and the masses of the spinal erectors. Before doing that, I would emphasize again the planes of the rib cage which we covered in Chapter 3. It is worth considering the furrow, or fluted channel, made by the change in direction of the curvature of the ribs, known simply as 'the angle of the ribs'. This furrow is seen in attenuated form when the muscles are added, fairly subtle towards the neck, and a deeper channel at the lower back.

Structurally it helps to think of the spinal erectors in two sections: first, as two cable-like cylindrical forms connecting the rib cage to the pelvis, attached either side of the lumbar vertebrae and working down to the sacrum. Second, as an ovoid mass on either side of the spine at the lower portion of the rib cage in the back. In reality there are a great many highly complex bundles of muscular fibre in play here, but for our purposes it works to mass them together into these simple geometric conceptions.

These are the forms that are the main players in the area of the lower back, and for which the latissimus dorsi at this point is only a thin covering. The rhomboids in the upper back similarly present ovoid masses that make themselves known through the thin covering of the trapezius muscle at that point. Having said this, there are important form considerations to be aware of, with the latissimus dorsi and trapezius muscles themselves, mainly in terms of the flat tendonous areas that make up part of their surface. There is a diamond-shaped area surrounding the seventh cervical vertebra.

There is also the circular area at the angle where the spine of the scapula joins its medial border. This presents often as a depression, and is a key clue in detecting the location of the scapula in the living subject. Though it is key to locate the critical skeletal landmarks, we often have to use what we know of the musculature to infer the presence of bone. Finally, in anatomical diagrams, the trapezius appears to end in a point at its lower limit, but because this end is in fact a small tendonous area, the trapezius appears to terminate here in two small points, something like a 'W' shape.

The bony spine of the scapula shows as either a prominence in very lean subjects, a sort of plateau in the average build, or a furrow if the surrounding muscles are very developed. The teres major is an important aspect of the terrain in this area, as it helps us to infer the lower limit of the scapula and generally orient ourselves in the shoulder region. It is often egg-like in form when the body is at rest. The infraspinatus above is rather strapped down by its surrounding aponeurosis so tends to present a somewhat flat and neutral plane. Above it is the rear head of the deltoid, which, like the trapezius described above, has its final connection (in this case to the scapula) via a tendonous sheet. This means that the muscle appears to 'begin' a little way lateral to the point at which the spine of the scapula joins its medial border.

Because of the significant range of movement of which the shoulder girdle is capable, the region of the upper back is subject to a wide range of deformations, some of which will be discussed below. Michelangelo's drawings are very instructive examples here.

The Abdomen

In the abdomen we find, as we have seen, that the arrangement of the packets of fibres of the rectus abdominis muscle is often highly irregular and lacking symmetry. There is obviously a great deal of variation in the terrain of this region as the belly is a place where fat accumulates. It is useful in mapping this area to consider the thoracic arch as a kind of border at the top, and the inguinal ligament – which runs from ASIS to pubis – functioning as the lower limit. The packs of the rectus abdominis are commonly more visible at the top than at the fattier bottom.

In terms of construction it helps to locate the 'belly' portion as beginning from the level of the navel, and there being four packs roughly fitting in the space between the navel and the costal arch. The overall edges of the rectus abdominis are interesting in terms of form. In broad sculptural terms, we can think of a front plane, then a step down via a side plane to the level of the front plane of the external oblique. Because of the fascia in this region there can be some interesting variations at this border, but it is best to keep these subordinate to the broad sculptural planes. Also prominent in this area is the cartilage of the tenth rib, which is often easy to detect.

According to Richer, the navel can be located halfway between the xiphoid process and the pubis. The rectus abdominis blunts the angle of the thoracic arch, which ends in a point on the skeleton. The inguinal ligament, which forms the border of the belly part of the abdomen, describes a line which is increasingly curved according to the degree of mass at the belly. In very thin subjects therefore, this line becomes more angular, closer to a taut cord moving from A to B.

The very lowest part of the back brings us to those surface characteristics which mark the presence of the pelvis. In particular there are two depressions that correspond to the posterior superior iliac spines. Projections on the skeleton, these form indents on the living figure due to the mass and substance of the surrounding muscles, the gluteus medius and maximus: taken with the point at which the vertical fold of the buttocks begins, they form a distinctive triangle. On either side of the lumbar spine it is possible to see horizontal wrinkles or striations when the spinal muscles are relaxed.

The iliac crest of the pelvis forms the limit of the external oblique muscle. The relation between bone and muscle here is important and variable. As with the costal arch of the ribs, the shape of the iliac crest of the pelvis is very angular in the skeleton, but is softened or blunted by muscle and fat tissue. The ridge of the crest of the ilium is generally only prominent towards the front, where it ends in the anterior superior iliac spine. Towards the back, we tend to see a furrow made by the way that the external oblique in effect overhangs the iliac crest. The small hollow in the flayed figure between external oblique and latissimus dorsi (see Fig. 125) is filled with fat,

which can be quite substantial.

The way in which the terrain of this area can be modified by fat is very significant, particularly in some women; in those cases, from the back it can be hard to make distinctions between gluteus medius and external oblique. Their interval can be smoothed over with fat, making one continuous form, and this can prove disorienting in terms of the general construction of the torso.

Fig. 155 Note the attenuation of the form of the pelvis and its major muscles as it is covered and softened by skin and subcutaneous fat.

The Groin and Pubic Region

It is important to study the groin and pubic area because in morphological terms it forms a sort of interval in the transition between the torso and the legs – a transition which it is easy to make too abrupt. There are a couple of lines, folds or borders which it is helpful to consider. First is that created by the inguinal ligament which connects the ASIS to the pubis, and which we have already covered.

The second is sometimes called the line of the thigh. This is essentially the flexion fold that accommodates the bending of the thigh up towards the body. As mentioned previously, there is a distance of about three fingers' breadth between the ASIS and this flexion fold. This area is often

accidentally missed, with the mass of the thigh being incorrectly drawn as coming directly out of the ASIS. The line of the thigh attenuates as it moves out from the centre; it ends roughly at the depression created by the divergent paths of the tensor fascia latae and the sartorius. Between the lines of the thigh at the centre are the forms of the genitals.

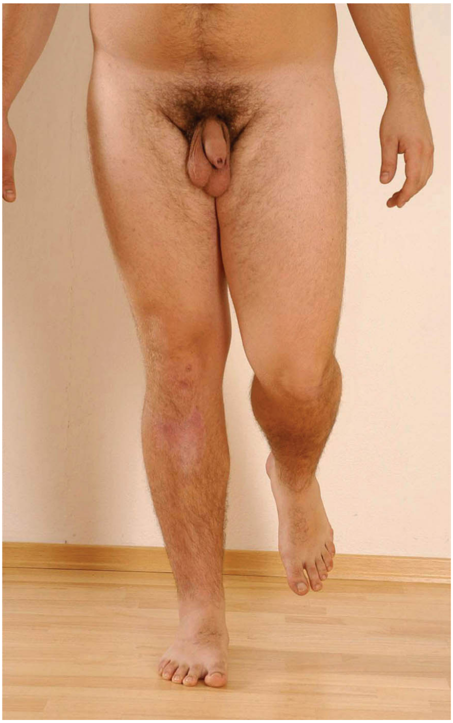


Fig. 156 The pubic region is an important transition from the torso to the legs.

The Gluteal Region

The dominant form idea for the gluteal region is something like a butterfly shape. This can be seen in the structure of the pelvis itself, and is accentuated by the volumes of the gluteus maximus and gluteus medius. The important fact about the gluteus maximus is that it inserts into the femur. This affects the surface fold of the buttocks, which is dragged with the movement of the femur. The clearest instance of this is when the model is standing with their weight predominantly on one leg, in which case one of the maximus muscles is in tension, the other relaxed.

The difference in the gluteal fold on each side can be easily observed. The gluteal fold does not follow the diagonal path of the gluteus maximus towards the femur, but instead cuts across it more horizontally. This diagonal insertion of the maximus can, however, be seen in certain positions, such as when the trunk is bent forwards as in touching one's toes. It is also

visible in some cases when the model steps forwards with one foot.

Fig. 157 Pelvic and upper leg structure.

The cleft of the buttocks terminates at its highest point at the sacrum and forms the lower point of the sacral triangle, bounded above by the two posterior superior iliac spines. Due to the significant presence of fat in this region there is a great deal of variability, and the factors outlined above regarding the flank should be borne in mind.

In a profile view, the buttocks project back quite significantly. For instance, a vertical line drawn up from them will clear the back of the head.

The Arm

Richer points out that the upper arm has an interesting example of form variation according to muscular development. In lean or average physiques it is generally cylindrical, whereas when the musculature of the region is more developed, we are presented with a more planar structure, flattened on the sides. The deltoid at the upper part of the arm creates the form of the shoulder, and this corresponds with the muscle as described in Chapter 5, though the contours are softened compared to the flayed figure.

The back of the arm is home to the egg-like volume of the mass of the lateral and long head of the triceps, and to the comparatively flatter area of

the common tendon which joins both to the olecranon. The medial head of the triceps adds a swelling to the contour of the inner arm towards the elbow joint. The lateral head of the triceps is described by Scott Eaton as being an 'egg and tail'. This external limit of the lateral head corresponds to a dividing line between the triceps and brachialis, which forks below to allow the emergence of the forearm extensors.

The Elbow

The elbow has many interesting surface characteristics. From the front there is a V-shaped character created by the borders of the pronator teres muscle and the brachialis. The tendon of the bicep itself drives between these to its insertion at the proximal radial tuberosity. This tendon becomes visible when the bicep is in tension, and can easily be felt under the surface. On the back of the elbow region we find the prominence created by the bony knob of the olecranon. To allow for movement of this joint the skin is loose in this region and can be pinched; when the arm is fully extended this can create a distinctive fold.

The medial epicondyle shows itself as a prominence, whilst the lateral epicondyle usually registers as a dimple. The anconeus muscle creates a triangular plane that emerges from the lateral epicondyle and reaches over to 'grab' the ulnar furrow. The curve of the ulnar furrow suggests a rhythm which connects to the medial epicondyle. Combined with the triangle of the anconeus, this creates an oblique dynamism in the morphology of this area.

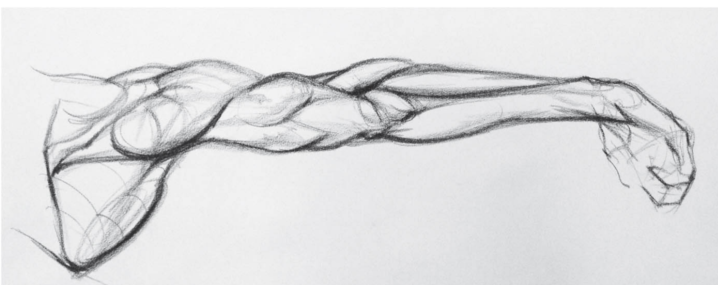


Fig. 158 Muscular structure of the arm.

The Forearm

The forearm itself, as previously mentioned, tends to be more egg-like in volume above, and more block-like below, towards the wrist. On the front of the arm there is a flattened quality, or gentle undulation. The furrow between the extensor and flexor masses is only really visible on the very lean; the rest of the time it would be detected only as a subtle modulation of form. On the back of the forearm, the crest of the ulna creates a furrow which divides the flexors from the extensors. Many of the strap-like forms of the extensor muscles begin to blend into one another at this point, which is

where the practice of considering them as groups again recommends itself. What becomes important is the way in which these groups are layered, the radialis group overlapping the extensor group, followed by the emergence of the thumb muscles at the wrist.

The Wrist

The wrist itself is, as we have established, primarily formed of tendon and bone, and box-like in form. We can consider some of the tendons in the area as forming the four corners of the box. On the little finger side, we have the tendon of extensor carpi ulnaris above and flexor carpi ulnaris below. On the thumb side we have the tendons of extensor pollicus longus above and abductor pollicis longus below. On the palmar side, the mass of the tendon creates the gently curved plane of the wrist. Above, on the dorsal side, it is the distal heads of the radius and ulna that create the form.

The Hand

The exterior form of the hand is primarily bone on the dorsal side, and muscle and tough fatty pads on the palmar side. A key form is the first dorsal interosseus muscle, the ovoid form of which can easily be seen by squeezing one’s thumb inwards against the index finger. On the palmar side there are two significant masses: the thenar eminence at the base of the thumb, and the hypothenar eminence along the border of the palm on the little finger side. These two masses form the heel of the hand also. The substance of the two eminences produces the depression in the centre of the palm.

A key aspect of the form of the hand is that the proportions of the finger sections, and the finger length itself, appear different on the dorsal side as to how they appear on the palmar side. This is due to the fact that the form of the palm overlaps the first phalanx of each finger significantly, therefore making the fingers appear shorter in a palmar aspect. This also has the effect of making each phalange of each finger appear to be proportionally equal one to another, whereas on the dorsal side this is not so. The transition from wrist to hand on the dorsal side takes the form of a downward step of planes, rather like a ramp.

The Upper Leg

As with the upper arm, the basic conception of the upper leg is that of a cylinder, becoming more planar in character as the musculature becomes more developed. We have already described the grouping of the muscles in this region, and what we find in the living figure is an attenuation of those facts. For instance, the lines of demarcation between muscle groups are diminished by fatty tissue. The boundary marked by the sartorius is still an important feature in organizing the terrain, but its visibility can be slight.

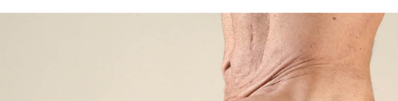


Fig. 159 Surface form of the leg – compare this image to the earlier ecorche images.

The mass of the adductors is generally formed into one ovoid form, softened further by fat. Having said this, it is a good idea to become familiar with the more abrupt changes in contour that we find in the flayed figure. Although it is true that the fundamental thing to consider is the basic geometric character of a form – in this case the cylinder – here it is important that in the end the form does not have a generic character.

Fig. 160 Surface form of the lower leg – observe that the complexity of the musculature is often smoothed out in the living figure.

Also, and as we see so often, the character of the bones forces the form of the muscle and flesh. The angle and curvature of the femur should be held in mind to avoid the common scenario of legs being drawn as if they are pillars, which is a logical enough assumption given their supporting role. However, the body is not so regular, and the oblique vectors of the femur are accentuated by the dynamic plaiting of the musculature around it.

Fig. 161 Muscles of the upper leg, grouped and simplified.

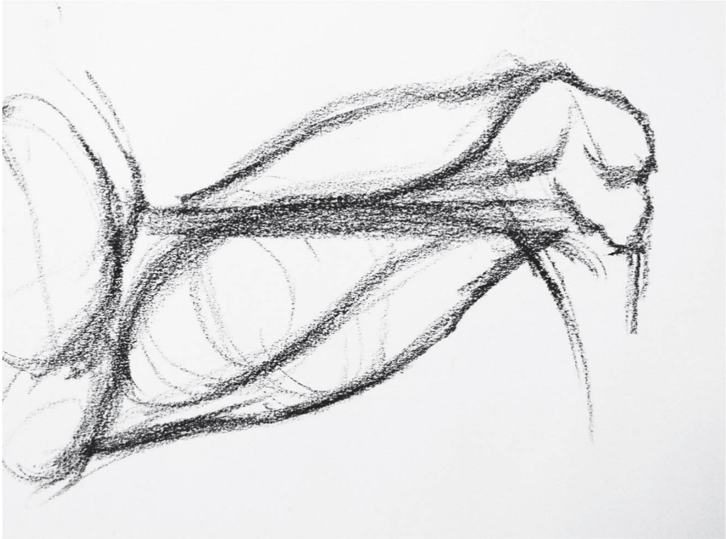


Fig. 162 Observe the direction of the sartorius muscle, running from the ASIS to the inside knee.

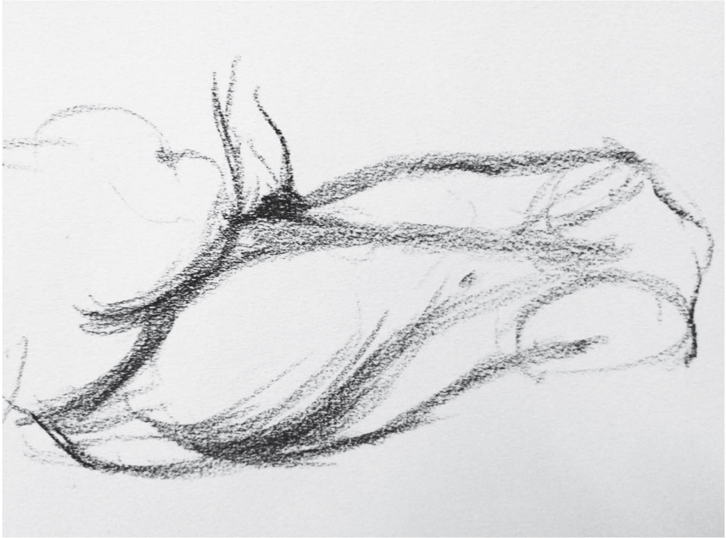


Fig. 163 The sartorius muscle separates the quads from the adductor group.

The Knee

The area of the knee comprises a highly variable mixture of forms, and much change occurs with movement. The bony structure of the block-like heads of the femur and tibia create a four-sided mass, narrower in front than it is in the back. The patella, or knee cap, is furthest forward and sits in front of the femur. The condyles of the femur and the crest of the tibia can be seen on the surface, as can the patella. The patella has padding between it and the femur, and a body of fat beneath, which cushions and bulges out around its form.

The tendon that connects the patella to the tibial tuberosity is not generally visible, and the blending of forms in this area can create a curved, oblique, triangular plane leading to the blade of the shin. This plane is reminiscent of that created by the anconeus at the elbow, which similarly moves towards the crest of the ulna.

Above the patella we can see the curved plane made by the common tendon of the quadriceps muscles, with the swelling of the vastus medialis muscle making contact with the patella at the inside. This muscle is bordered by the sartorius, which contributes to the general rounding out of the forms on the inside.

Fig. 164 The forms of the knee demonstrate the flowing, spiralling quality of the musculature.

Fig. 165 The patella has a distinct fatty pad beneath it, which blends into the tibial tuberosity below.

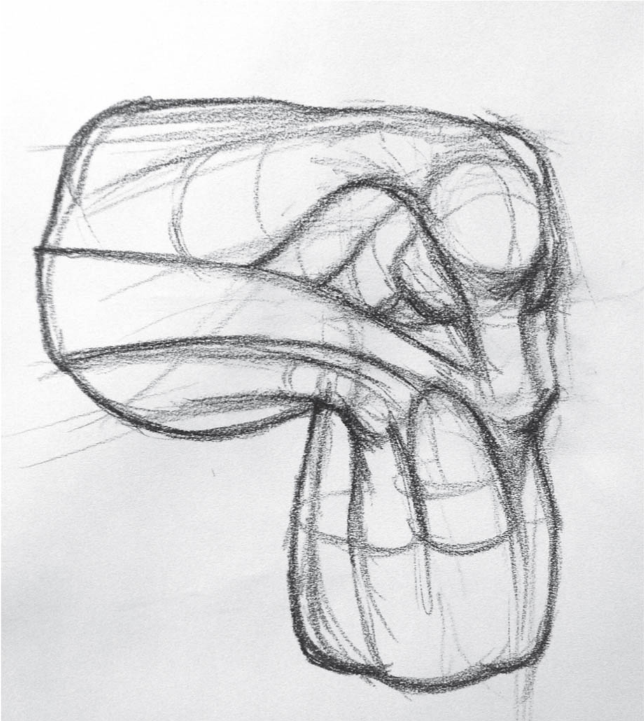


Fig. 166 The bent knee sees the patella pulled back, and the surrounding muscles stretch.

The back of the knee presents wrinkles or flexion folds, and the popliteal hollow on the flayed figure created by the gap between the biceps femoris and the semitendinosus and semimembranosus muscles is filled with the popliteal fat, and makes a gentle swelling.

The Lower Leg

Like the lower arm, the lower leg can be summarized as being more fleshy in its top half, and more bony and tendonous in its lower half. The bulbous form of the gastrocnemius dominates in the back. As has been described, it is more rounded and fleshy on the inside, flatter and more planar on the outside.

The continuity of the skeleton is notable at this point: the surface of the tibia is uninterrupted from the internal surface of its crest at the top, all the way down the medial plane of its shaft to the medial malleolus at the bottom. This can easily be felt on the living figure. Because the cross-section of the tibial shaft is triangular, this acts as something like an interruption into the otherwise cylindrical cross-section of the lower leg as a whole. It also provides a channel that joins up with the sartorius above, and so takes us all the way up the leg to the ASIS.

On the outside of the lower leg are the peroneal muscles, which are convex and can often be grouped together, though furrows between the individual muscles are also sometimes visible.

The extensor muscles of the toes are comparable to the thumb muscles at the lower end of the forearm: study one, and the other starts to seem more familiar. At the ankle we start to see how these muscles, and the tendons of those above, modulate the abrupt changes in the form of the skeleton into the more continuous planes of the living figure. In particular, the tendon of the tibialis anterior should be emphasized as a factor in this transition in the front view. In the back there is, of course, the very substantial Achilles tendon which connects to the heel and is the strongest tendon in the body.

Fig. 167 Structure of the foot – observe the thickness of the tough, structural fatty pad of the sole of the foot.

The Foot

Though the surface form of the foot is, like the hand, heavily dependent on the structure of the bones, in some ways it presents the greatest disparity between skeleton and surface form to be found in the body. This is due in part to the ratio between bone and superficial fatty tissue. In particular it is the base of the foot, made up of very tough, fibrous fatty tissue, which demonstrates this, especially in the toes, whose proximal phalanges are

almost completely lost among it.

This is one reason for the foot presenting so many difficulties in drawing. The bones present a dynamism which is so attenuated that it can easily be missed in the living figure. For instance, it helps to consider the way in which the metatarsals are organized, as if according to two groups, which we might call the heel group and the ankle group. The ankle group consists of metatarsals one to three, and these share a connection via the tarsals to the talus bone, which sits atop the calcaneus. Metatarsals four and five, however, connect via their tarsal bones to the calcaneus itself. When this is taken into account, we can see from a top view of the foot that the heel group is on a slightly different axis to the ankle group. This can be seen in the fleshed foot, especially on the inside, where the heel seems to head under the arch of the foot.

In terms of the toes, some previous study of the hands and fingers will help a great deal. As mentioned, the bony structure of these digits is prominent on the dorsal side, whilst underneath, fat pads predominate. The tough and fibrous nature of the fat pads of the foot is worth bearing in mind when drawing, as this reminds us not to make our contours too slack. The firmness of the tissue affects our conception of the form – the heel fat pad, for instance, is something like a tough rounded disc, or puck of fat.

As mentioned previously, there are a few significant muscular forms on the foot. In particular the ovoid form of the extensor digitorum brevis is worth emphasizing again.

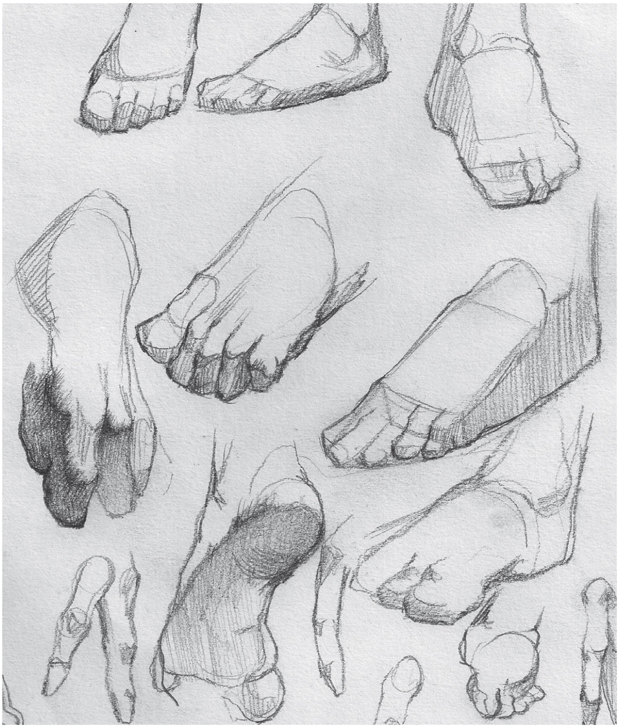


Fig. 168 Sketchbook page of feet drawn from memory.

Movement and Deformation

Movement of the Torso

When considering the structure of the figure, the spinal column is obviously a primary concern. However, it is easy to take the spine as an isolated entity, which can lead to only a vague understanding of its effect on the form we see. As previously discussed, we have three sections to the spinal column: cervical in the neck, thoracic on the rib cage, and lumbar in the lower back. The side view of the skeleton is of use here as we can see more clearly the relationship of the vertebrae to the forms of the rib cage and pelvis. In particular it can help to think of the vertebrae that attach to the rib cage as being relatively immobile and fixed to its egg-like form.

This leaves us with the other two sections as being the main movers. The capacity of the neck to bend forwards, back, and left to right, and to rotate in combinations of these, is reflected on a larger scale in the lumbar vertebrae of the lower back. This is, of course, a simplification and serves to give us a basic schematic to bear in mind in our construction of the body. In reality, the thoracic vertebrae do move in order to variously perform stabilizing functions and transference of force. For example, if the upper

body is bent forwards as if touching one's toes, movement of the thoracic vertebrae will be visible in an accentuation of the curve of the rib cage's egg-like form.

Understanding Rotation of the Torso

Rotation of the spinal column is more limited than it seems – this is because when the body rotates, the appearance of twisting is accentuated by rotation of the pelvis as well as twisting of the shoulder girdle. Movement of the shoulder girdle is responsible for many misunderstandings of the structure of the torso.

If we think of the forms of the pelvis and rib cage as two rigid masses, then we can see how the soft muscular tissue in between is subjected to various sorts of squashing and stretching. For example, when the torso bends, the belly is squashed, presenting a fold at the level of the navel. When there is a lean to the right or left, the forms of the flanks and oblique muscles are compressed on one side and stretched on the other. With a forward bend seen from the back, we are likely to see a stretching of some of the large muscles of that region, such as latissimus dorsi and the trapezius. This can reveal evidence of the form of the ribs themselves in the lower lateral part of the back.

Muscle Interplay

The way that muscles work together is very complex – seldom, if ever, do they work in isolation, and many others play supporting roles, or have antagonistic and therefore balancing functions.

Also evident in a forward bend is a contraction of the gluteal muscles, which in this case are performing a balancing function. With bending, rotation and lateral inclination of the trunk there are comparatively few form changes in the chest in the front, and in the upper back from the back view – such changes really present themselves the most with the movement of the shoulder girdle and the arms, to which we now turn.

Movement of the Shoulder Girdle

What we see when the shoulder girdle moves are various deformations of the muscles attached to it, as well as the arcing paths of the bones themselves. When the arm is raised, the clavicle moves up, and the scapula swings around the rib cage, according to the scapulo-humeral rhythm (*see* Chapter 5). This involves a stretching of the muscles between the scapula and the spine, and a compression of the muscles between the shoulder and the neck. Because the deltoid originates from both scapula and clavicle we can often see a greater distinction between its three sections as well as an overall increase in bulbous form.

Fig. 169 Changes in form of the upper back.

Shoulders Carried Forwards

As discussed above with a forward bend, here we tend to get a rounding out of the back. In such movements of the shoulder girdle, it is the deep muscles that are responsible for much of the surface form, in this case the deltoid, rhomboids, teres major and infraspinatus, trapezius, serratus anterior and the spinal erectors. The latissimus dorsi is a thin muscle for much of its expanse and so it does not create much form of its own, instead revealing the impressions of the muscles just mentioned. The exception to this is where it attaches to the humerus, where it does thicken. Its front boundary is also visible in many poses.

Fig. 170 Changes in form of the upper back, with arm raised and carried forward.

As mentioned in Chapter 4 on the skeleton, it is the movement of the scapula and clavicle in relation to the upper arm that we need to track. If we can understand this, the massive range of form that is to be found in the back becomes less daunting when we have a way of approaching it. This often involves some exploration and deduction. The bones are not always clearly visible so we sometimes need to infer their presence from what the muscles are doing.

As far as the scapula is concerned, we are looking for the acromion process, the internal top angle of the scapula (where the scapula spine meets the medial border), and the lower angle of the scapula, where its triangular form comes to a point. By detecting these and tracking the vectors of the origins and insertions of the relevant muscles, we can arrive at a schematic idea of the layout of the region. This is essential when constructing the figure from memory, as well as during the early stages of the observational block-in.

Another stage where this comes into play is when one is doing any kind of fine modelling. In that scenario, with some anatomical knowledge, we are better equipped to observe and translate the morphology of the body.

Shoulders Carried Back

When the arms are drawn behind the back, the scapula moves inwards towards the spine. In this case we see a compression of the rhomboid muscles. The chest is pushed forwards, and the back becomes flatter. Teres major and infraspinatus swell – though mostly teres major: the infraspinatus is a less showy muscle. We also see swelling in the rear head of the deltoid. Such is the importance of the distinctions of the deltoid heads, they are worthy of the attention given to three separate muscles.

Movement of the Forearm

The forearm presents one of the most challenging areas of the body to understand due to its many small structures, but also because of its range of movement, from supination (palm up) to pronation (palm down), right through to forced pronation where the maximum twist is gained by full inward rotation of the upper arm. What this means is that all our carefully studied origins and insertions are twisted and carried over with the movement of the thumb side of the hand.

It can help here to think about how some forms and landmarks ‘stick’ to certain elements of the hand. For example, the extensor digitorum is like a strap which is connected to the back of the hand, meaning that we can run a path from the lateral condyle of the humerus to the back of the hand to find it. Then to its outside, we know we will have extensor carpi ulnaris.

The mass of the radialis group undergoes more deformation, particularly if the arm is bent in conjunction with pronation, where it can become squashed upon itself, disrupting any clear linear vector from origin to insertion. In pronation the upper forearm becomes more rounded. It should be said that this action of the forearm has knock-on effects on forms throughout the arm as a whole, and even into the upper torso, such as changes to the pectoralis and deltoid muscles. The best reference for these changes is to be found in the diagrams of Paul Richer.

Movement of the Knee

The forms of the knee at rest have been described above, but these are significantly changed when the knee is bent. Several changes in form can be observed. The most significant is the retreat of the patella into the space opened up by the rocking of the femur upon the platform of the tibial plateau. As this happens, the points of connection to the patella, namely the common tendon of the quadriceps and the patella tendon itself, become stretched. This means that the characteristic quality of muscle and fat pressing, bulging and hanging over the patella is lost as forms are pulled taut and flattened. What begins to predominate more is the very box-like quality of the bones, and a new, oblique flat plane is created between the lip of the tibia and the condyles of the femur.

Bending of the knee also reveals the disposition of the hamstring muscle insertions, and their character as grabbing on to the knee with a gap in between, from which the swelling of the calf emerges. In extreme flexion,

the calf and hamstrings are squashed against one another, and on the outside, the fibula's status as a connecting point for muscle and tendon can be clearly seen as those insertions bunch up.

Tendonous Tissue and Surface Form

When studying the muscles it is important to consider tendonous tissue and surface form in terms of how they present on the surface. If our key skeletal landmarks are primary insofar as the skin is bound closely to them, then next in line of importance would be those tendonous areas of the muscles which act as a semi-rigid connection between muscle and bone. Skeletal landmarks reveal themselves as either projections or dimples, whilst tendonous tissue often presents as a flat or neutral plane.

The clearest example is perhaps the posterior head of the deltoid. It is easy to misunderstand this section of the muscle as straightforwardly originating from the point where the spine of the scapula meets its medial border. In fact before the muscle fibres begin, there is a small triangular area of tendon that provides a pause before the muscle begins to bulge.

Major Form-influencing Flat Tendonous Areas

- Diamond-shaped area around the seventh cervical vertebra
- Circular 'wheel' area of the trapezius at the top corner of the scapula
- Triangular area at the posterior connection of the deltoid
- Diamond-shaped area from the centre to the bottom of the latissimus dorsi
- Strip of tendon at the connection of the gluteus medius
- Circular area covering the great trochanter of the femur
- Ilio-tibial band
- Quadrangular section of the tendon connecting the triceps to the olecranon
- Quadrangular section of the tendon connecting the vastus muscles to the patella
- Achilles tendon
- Richer's band

Dominant Anatomical Lines

We have already looked at ways of simplifying the muscle masses, but this still leaves us with the challenge of putting everything together. Even with simplification, we still have a great many parts to organize. The goal here is unity, and this is one of the paradoxes of studying anatomy: in order to better understand the wholeness of the body, we have to take it apart and study it bit by bit. Sooner or later, however, we have to put everything back together. This takes time and practice, but there are some dominant structural rhythms and conjunctures that can help us.

Construction of the Leg

The upper leg is a good place to start. Here we can think of the diagonal path cut by the sartorius muscle as it wends its way from the anterior superior iliac spine to its destination at the inside of the tibia. The direction of the sartorius is therefore of primary importance in the construction of the leg. It fulfils many of the criteria we look for in reliable anatomical construction. It moves from one clear bony landmark to another; it is essentially a vector; and it delineates the boundary between two muscle groups, in this case the quads and the adductors. At its lower end, it also contains the border of the teardrop-shaped head of the vastus medialis.

There is also a useful and important tendonous area just above the patella. This is rhomboidal in shape, and as with other such areas, forms a flat or neutral plane. This area is most visible when the leg is straight, though in other positions it still informs the placement of the masses of the vastus lateralis and vastus medialis: higher on the outside and lower on the inside respectively.

The triceps tendon is analogous to the area just above the knee. Likewise, it is important in terms of understanding the construction of the triceps.

Finally we can consider the inverted 'V'-shaped depression made by the divergent vectors of the sartorius and the tensor fascia latae. This cavity is where the rectus femoris emerges and is the 'bending point' of the leg, the point where the flesh creases. Between this point and the ASIS there is a distance of about three finger widths.

It can help to think of the body as if it were an architectural form. We can consider the sartorius, the tensor fascia latae and the inguinal ligament as three cables in tension pulling out radially from the ASIS. The inguinal ligament stretches from the ASIS to the pubic symphisis and forms the lower border of the abdomen. In the front view this is the dividing line between the upper and lower parts of the body.

Trapezius

The trapezius has some important tendonous 'moments'. The first is the diamond-shaped area surrounding the seventh cervical vertebra. The second is the circular area of tendonous tissue that is found at the point where the spine of the scapula joins its medial border. These are instructive in terms of understanding how muscle fibres relate to them: because the fibres pull against these tendonous areas, their direction tends to be perpendicular to them.

In the case of the trapezius, this accounts for the complex changes of direction to be found in the fibres, which sweep down from the skull and out to the spine of the scapula, guided by the diamond-shaped tendonous area at C7. The fibres then rotate around the circular hub of tendon at the corner of the scapula and head down to the centre of the back. This is a clear example that can guide the study of other muscles.

These tendonous areas can be used in quick notations of the figure, alongside the key skeletal landmarks.

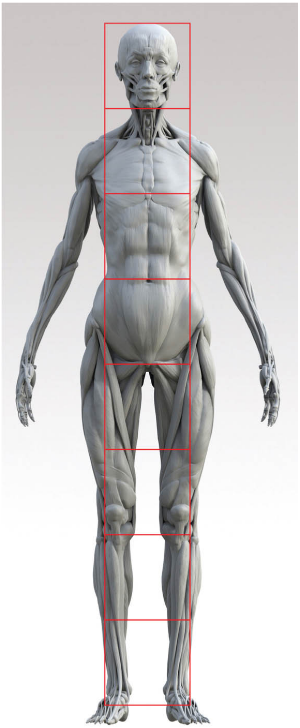


Fig. 171 The 8 head proportional figure seen from the front.

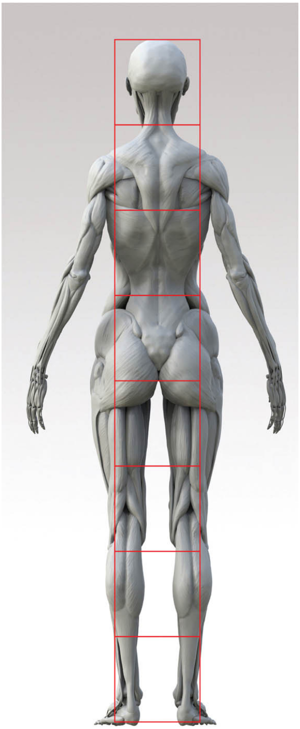


Fig. 172 The 8 head proportional figure seen from the back.

Proportional Canons

The discipline of studying proportions helps in cultivating a general feel for them: in the end, this is something that we can really use. It is a common misconception that proportional systems are a way to 'calculate' a figure, much in the way that an equation might guarantee a certain outcome. However, in creating the illusion of bodies in three-dimensional space, there are too many variables at work for there to be a standard approach, and each drawing is its own unique problem – although we can generalize about 'scenarios'. The same misconception is also true of measuring, which we will discuss in the next chapter.

A sense of proportions is most crucial when constructing the figure from memory. It is also good as a kind of sanity check when drawing the figure. Despite the fact that the total system cannot apply in foreshortening, there are often parts of the body that are relatively unforeshortened and so can be checked with some of the following comparisons. The approach to proportion that we will use here is the more conventional model of taking the head as the basic unit of measurement.

For the head unit system we have two options. One is based on the work of Paul Richer, which is explained in detail in his classic work *Artistic*

Anatomy. In this work he divides the height of the body into 7.5 head units; his measurements are based on statistical averages from anthropological measurement data. Here we will look at a simpler system whereby the body is divided into eight units (*see* below). A less conventional, or less common measuring system is outlined in the work of Robert Beverly Hale, who takes the width of the cranium as his datum. This is too involved to cover here, but is well worth studying as it reveals many fascinating correspondences in skeletal proportions.

Head Unit Proportions

In this system the body is divided into eight units:

- Body = eight heads high
- Upper body = four head units
- One head height to the chin
- Two heads to the level of the nipples
- Three heads to the navel in front, and in the back to the top of the gluteal muscles
- Four heads to the lower limit of the genitals in front, and to the gluteal fold in the back
- Lower body = four head units
- Pubis to the tibial tuberosity = two heads
- Tibial tuberosity to the ground = two heads

CHAPTER 8

THE PROCESS OF OBSERVATION

Two-dimensional Skills

As I have suggested, there are many approaches to drawing the figure – this much is obvious from the variety of approaches found in art history. With this said, it is easy to mistake particular considerations for a wholesale approach. For example, it would be simple to say that one might take a structural approach focused on perspectival form, or a more purely optical approach, focused on shape, and the capture of the visual impression. However, I would want to suggest that these are not approaches to the problem of creating a believable illusion of the body, but rather that they are factors at play in solving that problem. The extent of the effectiveness of either one ultimately depends on an understanding of both.

The structural factors have been covered in chapters to date. Here we will concentrate on the more optical factors, to do with visual acuity associated primarily with instruction in figure drawing developed in the European fine art academies of the eighteenth and nineteenth centuries. These are all tools or frameworks that can be used in different ways, so it is important not to see them as matters of superficial style, or to be doctrinaire as the superiority of one approach over another. There are different tools for different jobs, and most people find that emphasizing some factors rather than others works better for them. It is common to end up with our own particular – even idiosyncratic – ways of solving drawing problems. This may mean that we develop an approach that is a hybrid of a range of methods, with our own set of priorities.

Whatever the purpose of our drawing, we have to acknowledge the fact that we are working on a flat surface. Therefore, sound skill in seeing shape, angles and direction are just part of the fundamental skills needed for representational drawing. This is also true of sculpture, where acuity in analysing the silhouette of a form is key. What follows is a simplified account of the types of analysis involved in addressing these factors.

Fig. 173 Example of a block-in drawing of the figure. Considerations at this stage are gesture, shape, basic layout.

Fig. 174 Example of a block-in drawing of the head.

The Block-In

The block-in is the primary way of analysing critical shape relationships. The general rule throughout this book is that we will proceed from the general to the particular, from large to small. The block-in is essentially the job of placement and is sometimes referred to as a lay-in: a simplified version of the image containing its most essential features. To do this well involves learning to exclude all detail and minor incident and concentrate solely on the larger visual structure. The question is always this: what is the primary information?

What follows are some examples of what to look for. One of the difficulties of doing this is avoiding the temptation to get involved in minor details. The problems that tend to come from doing this is that one individual part may be resolved very well, but that the overall drawing is not convincing. The key information resides in large relationships, especially as far as the human figure is concerned. We are very well practised in recognizing and processing information about the body in many ways. An effective illustration of the importance of broad relationships is the example of how we are able to recognize someone we know even when seen at a great distance.

A good idea when practising a block-in drawing is to limit the lines you

use to only straight, or slightly bent lines. This forces you to make clear decisions as to the tilt and length of each contour you draw. Without doing this, many subtle changes of direction can be missed. It is common to see figure drawings made up of overly generic curves. The other advantage of using only straight lines in the early stages of the drawing is that it simplifies and reduces information to the essentials. The analogy would be with a computer model made up of only a small number of polygons – in such a case there is less information for the computer to process, and so calculations can be made more efficiently. It is the same for us.

One common difficulty is in using straight lines whilst retaining some fluidity and spring to one's drawing. This takes some practice. Be wary of making lines too heavy: it is better to 'brush' the paper with the pencil, rather than to gouge channels into it. Drawing with a 'follow through' is also key. This means that lines should extend beyond their destination, so that points are made by crossing lines rather than simply ending a stroke and hoping that its length is correct. This means one can draw from the shoulder with a free and fluid stroke.

Another crucial component of the block-in is the willingness to stay with it for a while and to make changes. Very often students will take the idea on board and make a basic block-in drawing, but will not assess and correct it before moving on. This greatly limits the benefit of working in this way, as many major drawing problems can be dealt with at this stage whilst the drawing is in a simple state. It is far easier to correct a proportion when the drawing is made up of clear segments than it is when an entire form has been developed and rendered in full detail.

Concepts in the Block-In

Locating the Boundaries of the Form

It is important to develop a sensitivity to the overall 'footprint' that the drawing will occupy on the page, and to at least make a rough estimation of this before launching into the modelling of individual forms. Considering this reveals to us how much all drawing is to some extent editing: a set of decisions on what to include, and what to exclude. For instance, our first decision might be that we only want to draw the model before us, and not any of the surrounding environment.

Often these decisions are taken as given, and so are not egistered as decisions as such, so it is good to be mindful of this and take ownership of the task at the earliest stage. In simplest terms we might simply locate the visual top, visual bottom, extreme visual right point and extreme visual left point of the form. In essence, here we are thinking of the body as if it were entirely flat – a cut-out or a silhouette.

The 'Top' of the Figure

What is the difference between the top of the figure and the 'visual top' of the figure? Referring colloquially to the 'top' of the figure may give the impression that we are

talking about, say, the top of the head. Referring to the visual top makes it clear that we are referring to whatever part of the form is extended furthest upward in our field of vision.

Fig. 175 Establishing visual limits of the subject.

Fig. 176 Relating visual structure to a plumb line.

The Plumb Line

It can also be extremely useful to locate a plumb line in the figure. This is an imaginary vertical line that runs through the pose. It is chosen by the artist in order to help make sure that those parts of the figure that are furthest from one another – and so therefore most likely to go astray – are related from the beginning. For instance, in a particular pose it may be that a line can be found that runs from the plane of the forehead down to the back heel of one foot. Choosing a reference guide, and establishing the same relationships in one's drawing at an early stage, can, again, prevent problems that will inhibit us later on.

The Envelope Shape

The envelope shape is another approach to analysing the footprint of the drawing, and is a simple shape made up of straight or slightly bowed lines, as described above, that encompass the form. This shape should be made up of about six or seven lines (or thereabouts), it should be asymmetrical, and should respect the high, low, left and right points. Learning to analyse forms two dimensionally in this way is deceptively simple. Many students miss an opportunity here in that this is a very quick thing to do and so can be

practised many times over in a short period. It is really worth the investment to do this, as the pay-off is an increased awareness of the broad layout of the drawing on the page, and of the broad relationships across the figure.

The results in real terms are fewer of those moments later on in the drawing when you realize that there is a major problem in placement or proportion, and have to undo a great deal of work. Another reason for practising these skills repetitively is that when we do, we understand their flexibility. Often when an idea like this is first introduced, there can be a feeling that there is something inviolate about the envelope being made up of six or seven lines. Of course there is not, this is just a guide to make sure that we don't end up including too much information and detail at an early stage. With practice also comes the ability to analyse, simplify and block in form more efficiently. This can always be improved.

Fig. 177 The envelope shape.

Positive and Negative Shape

In developing awareness of two-dimensional factors, we are of course thinking a great deal about shape. The shape of what it is that we want to draw – say, a model's arm with hand placed on hip– would be deemed the positive shape. The negative shape in this case would be the shape of the gap between the model's arm and their body.

Being aware of negative shape is extremely valuable because it can be like a way of 'switching channels' in terms of our attention. When concentrating on a drawing task, we can become acclimatized to what we are doing. Our drawing becomes 'normal' to us very quickly, which is why having a good teacher can be so valuable – a fresh pair of eyes. We can, however, help ourselves, and assessing negative shape is a way of doing this. By diverting our attention elsewhere to entities that are absolutely linked, we can perform our own sort of cross-checking on the drawing.

There is also the possibility of using an artificial negative shape. The most common example would be the shape of the space between the legs of a standing figure. Unlike the above example, this space is not completely bounded, and so we have to close it artificially by imagining a connecting line between points of our choosing. This can be done almost anywhere on the figure.

Visual Skills

There are several key skills that we need to bring to bear on the above concepts if they are to be effective: sighting angles, interpreting curves, finding a new point by triangulation, and extending verticals and horizontals.

Sighting Angles

Sighting angles is the ability to relate any contour to an imaginary vertical and horizontal line. We can think of something like an imaginary crosshair, though the easiest way to relate to this seems to be to imagine a clock. This provides an easy way to mentally compare particular tilts: we can simply ask if the line we are observing is at, say, two o'clock, or just a little past. In fact this is an example of how we all use such skills in daily life, but are not used to applying them in drawing – unfamiliarity is often mistaken for difficulty.

We can make our two-dimensional analysis more efficient by combining it with our anatomical knowledge. Fig. 177 shows a standing model (see The Envelope Shape in the previous section). Here we can analyse the pose by looking for the envelope shape by carefully considering the tilt of each line. Then we can look for the tilts of major anatomical landmarks, such as across the shoulders from acromion process to acromion process, and between the ASIS points of the pelvis. The centre line of the torso can be broken down into three straight lines: the tilt of the sternum to the top of the costal arch, from here to the navel, and from the navel to the pubis. We can also consider the tilt of the centre line of the head, the angle across the knees, between the great trochanters of the femur, and any other points we want to relate.

In the back view, the importance of the shoulders and hips still stands as this is key to seeing the distribution of weight in the pose. The line of the spine can be broken down, though not as clearly as the centre line in front. Here it helps to consider the planes of the back, and the profile view allows

us to do this most easily. From the top 'shelf' of the shoulders we go out, then down, then in a little to the base of the twelfth rib, and then out again for the small of the back. Here we can look for the angle between the two PSIS points of the pelvis in the back.

Back up to the shoulders we can see that it is a relatively easy thing to locate the medial border of the scapula, its inferior angle, and the spine of the scapula. At the earliest stage of a drawing we are making estimates; we just want to aim to make these as efficient and informed as they can be. This leads on to the next section on how to interpret curves.

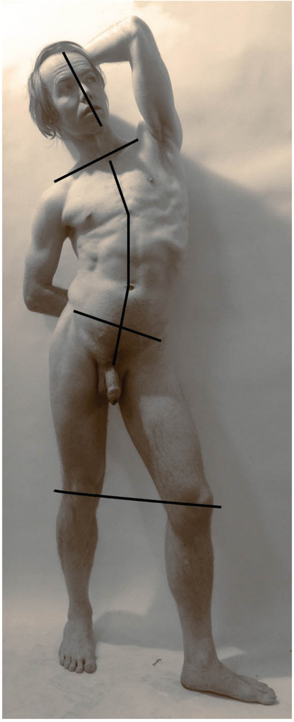


Fig. 178 Seeing the angles of anatomical features.

Curve Analysis

After the basic issues of placement, other factors that we should consider are ways to break down the visually complex undulations of organic form that the body presents us with. A good strategy of practice for this is to break curves down into segments made up of straight or slightly bowed lines. This is a good idea, especially for beginners, as it is very common to vastly over-generalize the curves that we see in the body. Also, bearing in mind again the question of editing, and that we are working with very limited means, we need to find a way to make our lines and tones clear and purposeful enough to stand alone and imply information about structure.

An S-curve can be broken down into two arcs, each with a beginning point and an end point. Each arc has a point of fullness, the 'belly' of the curve – and this is not always above the centre of the segment. Thinking of curves in this way can seem unnatural at first, but it soon becomes second nature. It also allows us to consider tilt, length, and where a curve begins and ends, which makes us much more decisive. The goal is not to forget about fluidity but to train the eye and mind to process information so that fluidity can include precision.

Triangulation

Triangulation is the method of finding a new point by relating it to two known points. We can observe the angle from, say, the acromion to the outstretched foot, and can mark this angle on our paper, extending it well beyond where we think it will end. Then we can observe the angle from the hand to the outstretched foot and mark this on our paper in the same way. Where these lines cross will be our previously unknown point.

Extended Verticals and Horizontals

A useful strategy is to extend mentally a vertical or horizontal line from a given point in order to compare its relation to another point far from it. This is the same principle as establishing a plumb line, but I include it as a separate idea as a reminder that the same can be done on an *ad hoc* basis.

Other Gambits

Other gambits include zig zags and using a mirror.

Zig Zags

Zig zags are not so much things that we would draw on our paper as a mental exercise, but ways of looking that we might employ when we are trying to get a fresh look at things. I will sometimes try to feel the path of the eye as it moves between two opposite contours: it seems to be easy to remember, because one tries it on the model, and then tries the same on the drawing. It is a good way to get a sense of changes of widths, and relative tapering and expansion of forms.

Using a Mirror

The importance of getting a fresh look at one's drawing has already been mentioned, and probably the best way to do this is to view the work in reverse by using a mirror. If drawing from observation this can be done so that both the model and the drawing can be seen simultaneously, and

usually, any gross errors become clear straightaway. In addition to using a mirror, another very effective way of refreshing perspective on a drawing is to take a break. Often, if we are absorbed in the wrong way with what we are doing, we cease to be critical, and end up consolidating problems.

The Importance of Checking

The most common error when first attempting to apply these principles is that we will try it once and accept the result. It is critical, especially at the beginning, that we perform the same measurement twice, three times, or more, until we get a repeatable reading. Eventually your judgements will become more accurate and reliable, and the use of these principles less cumbersome.

Measurement

We will look at a couple of approaches to measurement in observational drawing, one relative, the other absolute. Respectively these are comparative measurement, and sight size measurement. The latter is more involved in terms of studio set-up and so is less often encountered, so we will start with the former.

Comparative Measurement

Comparative measurement is really just what the name implies: the act of comparing one part to another in order to check proportion. What is key is that we start with a known quantity that can be used as a base unit, against which other parts of the body can be compared.

This approach requires good practice in measuring with a pencil or other implement held out at arm's length. The simplest example to illustrate this is to imagine that we are choosing the model's head as our unit. Holding out our pencil at arm's length, with the elbow locked to avoid distortion when we recheck, we put the point of the pencil at the top of their head, and our thumb at their chin. We then move the pencil down so that the point is at the chin to see what point is level one unit down.

This can be continued all the way down the figure, noting key landmarks as they coincide with our units. We may find that our head unit fits in seven and a half, or seven and two-thirds into the total height of the figure.

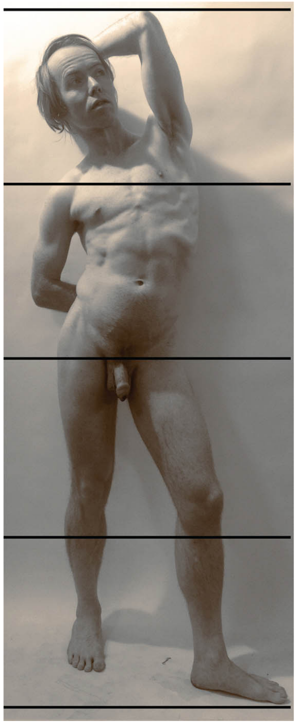


Fig. 179 Comparative measurement.

Again it is important to understand how this is different from analysing anatomical proportions in absolute terms. What we are doing here is considering the figure as if it were a flat shape, in order to aid placement. If our vantage point were different and the figure foreshortened somewhat, we might find that our head unit only fitted in, say, five times. To emphasize this point, it should be said that we can choose anything as our unit, as long as it is stable enough to remember. In some poses, for instance, it can work well to take as our unit the distance from the base of the foot to the tibial tuberosity, or some other landmark around the knee. In some cases this may fit into the total height four times or thereabouts.

The example in Fig. 179 is like this. The first unit is from the base of the model's left foot to roughly the left tibial tuberosity. The next unit marks the level of the crotch. The next one is roughly in contact with the acromion process on the model's right side. The final unit ends at the model's olecranon process (elbow). The only requirements are that, as mentioned, our unit is easy to quantify and remember, and this is where anatomy really helps – we have many more forms that we are aware of and can relate to such divisions.

It is also important that our units of measurement are neither too large nor too small so that they avoid becoming either unwieldy or uninformative.

Once preliminary measurements have been made in this way, the paper

can be marked accordingly, and divided up into the same number of units. Then a block-in drawing can be made, aided by the information gained from the unitized divisions.

The advantage of comparative measurement, because it is a relative comparison, is that it is up to the artist to decide how large or small the figure is to appear on the paper.

Dividing the Paper

Dividing the paper can, of course, be done with a ruler and calculator, but the easiest and most flexible way to do this is to use a pencil or other implement as before and mark off a unit with the thumb, estimating the size. You can then place this on the paper and repeat it by moving down. If you go off the page, simply slide the thumb closer to the point of the pencil to scale down the unit, and try again. If the height of the figure would come out too small, then do the opposite.

The advantage of this is that the scale of the drawing can be worked out by eye and feel without making any marks on the paper. When you are satisfied with the scale, the paper can be marked out accordingly.

Sight Size

The second systematic approach to measuring is known as the 'sight size method'. This is less commonly encountered due to its relative unfamiliarity, but also due to the fact that it does require a more involved set-up of the studio space, which is not always possible. The idea of sight size is that the scale of the image of the model, or object to be drawn, is determined by its distance from the plane of the drawing paper or canvas in relation to the point from which both are viewed together.

Imagine drawing with a marker pen on a window that has a view of a person standing outside. If the person is at some distance from the window and we draw around them, and then they approach closer and we draw around them a second time, the second outline will be larger than the first. In both cases the scale of the image is determined by the relative positions of the picture plane, the artist, and the subject. The idea is that when seen from the viewing position, the model and the image appear visually to be the same size. So a life-size image would mean placing the subject directly next to the easel – which may be desirable for a portrait. Variations in scale are thus made possible by varying the above parameters.

This approach to drawing allows for very direct comparison. Furthermore it is a type of comparison that is also very easily verifiable by an instructor, and so the sight size approach has advantages from this point of view.

Sight Size Set-up

It is important that the easel and drawing board are properly set up. The board needs to be at a comfortable height and perpendicular to the ground.

It is best to tape the paper flush to the edge of the board to aid comparison between the subject and the drawing. The position of the easel should be marked on the floor using tape. The viewing distance should also be marked, carefully noting the position of the feet: this is to ensure that you return to the same spot each time in order to get consistent measurements. You will need a plumb line – an easily visible colour of cotton with a weight attached to the end will work well; this will help you to clearly establish a fundamental vertical to refer to.

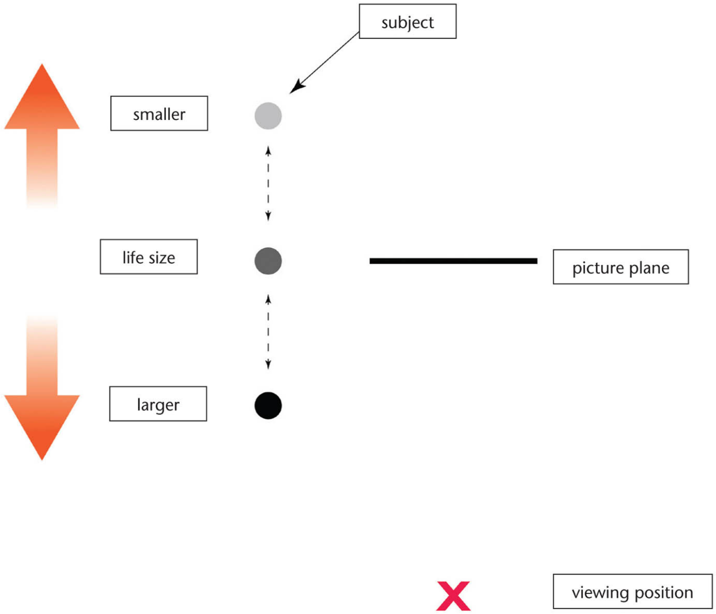


Fig. 180 Diagram showing sight size set up.

This separation of positions – one to view and assess, the other to make marks – is something that feels quite alien for most people encountering sight size for the first time. The viewing position is some distance from the drawing board – three times the largest dimension of the drawing is a good guide – and is the point from which all assessments and decisions about the drawing are made. The artist stands at this point, observes, and then steps forwards to the easel to make a mark. They then step back and repeat, correcting the previous mark if necessary.

We can relate this to some of the concepts and skills outlined above. The process might run as follows: holding our plumb line out horizontally, a line can be connected from the top of the model's head to the edge of the paper. The artist then visualizes where the plumb line is intersecting the paper, and steps forwards to make a mark at that point. The first attempt is usually off, so this needs to be attempted a couple of times, or as many as are necessary.

The same thing is done for the visual bottom of the figure – the base of the feet in this case.

The same process can give the height of important points such as the shoulders and hips, and the extreme visual left and visual right of the subject. The block-in drawing can be constructed aided by this sort of correspondence between the image and the model.

It is also possible to check widths by holding the plumb line out with each thumb at the chosen points – for example, across the width of the shoulders. Staying in the viewing position and rotating so that the plumb is over the drawing, one can transfer the width in the same manner as other measurements.

A Word of Caution

Some words of caution are useful. Sight size can facilitate extremely precise drawing and is an excellent way to condition the eye. However, although it is a very systematic and quantifiable process, it is not a way of 'calculating' a drawing – intuitive judgments have to be made, and the veracity of these is in fact what is being cultivated by such a process. The eye is being trained so has to be trusted too. The measurements are there as a sort of sanity check.

It also helps to be aware of sources of error in this approach. It can take some time to settle into this way of measuring, and to find a way of doing it that one is comfortable with. Variations in posture, or even wearing different shoes on another day of drawing, can throw the readings off and create more problems than benefits.

Very small measurements are not easy to do with this approach, as the margin for error is larger. Use of the mirror is also recommended, as outlined above. Such a disciplined approach can seem cumbersome at first, but one becomes used to it quite quickly. The habits learned also become internalized over time, and so come into play in more informal drawing situations. The drawing in Fig. 185 (*see* next section) was made using the sight size method.

This method presents an advantage in that the discipline of taking in the whole scene, and making global assessments of one's work, is built into the apparatus or system of sight size, and so helps to instil this difficult-to-acquire skill. Within these parameters, the process used is not dissimilar to those described in the section on comparative measurement, with the benefit of not having to transpose the dimensional relationships to a different scale. Of course, this can equally be a limitation in that such an approach to drawing requires a fairly elaborate set-up in order to determine the scale of the resulting image.

There are many schools of thought as to further applications of this approach, with some feeling that it is primarily a training method to develop visual acuity, and others using it as an artistic means to produce particular sorts of image.

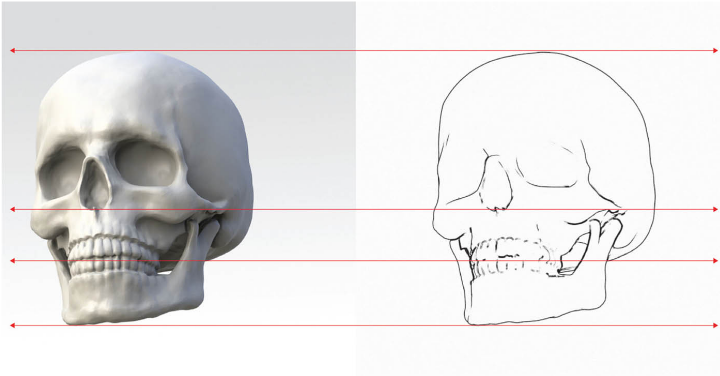


Fig. 181 The drawing and the subject appear to be visually the same size for easier comparison.

Rendering

The Shadow Pattern

The shadow pattern refers to the fundamental distinction between light and shadow; it is, in effect, a preliminary 'zoning' of the drawing. To clarify, this idea applies best to the situation of a subject lit by a single clear light source. Photographers or CGI artists might refer to a 'key light', and a 'fill light'. The key light establishes clear zones of light and shadow, while the fill light is a gentle, dim light that reveals some form in the shadows so they do not appear simply as black shapes. To block in the shadow pattern we can use all our skills at seeing and interpreting shape. However, it is important to understand the relationship between the shadow edge, and the concept of contour as running over a three-dimensional terrain (*see* Chapter 3).

A clear sense of the shadow pattern establishes the graphic structure of the image, and contains the essentials of how it will read at a distance. It is this structure that needs to be maintained through whatever successive stages of refinement or modelling you might choose to apply to your drawing. Fig. 186 shows a drawing in various stages of development: the block-in, the shadow pattern and the rendering. As with many of the principles in this book – perhaps all – they apply as much to drawings that take five minutes as they do to those that take fifty hours. If the drawing is quick, having a good grasp of the essentials is key to working in an economical way; and if the drawing is to be slow and highly refined, a grasp of those same essentials is also key to maintaining the vitality of the image, which can easily be lost under successive layers of working and reworking.

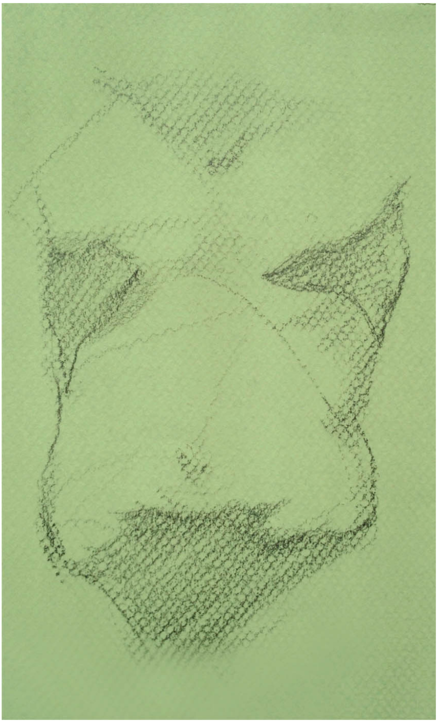


Fig. 182 Basic shadow pattern.

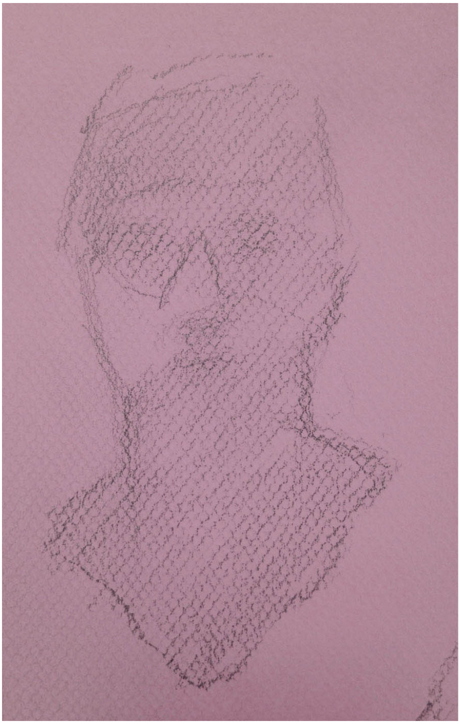


Fig. 183 Shadow pattern and atmosphere.

Fig. 184 Shadow pattern with attention paid to the quality of the shadow edge.

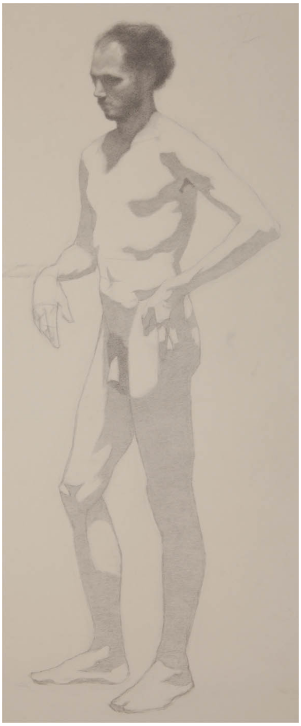


Fig. 185 Sight size figure drawing

Fig. 186 The different states of the drawing, with the block in and shadow pattern visible.

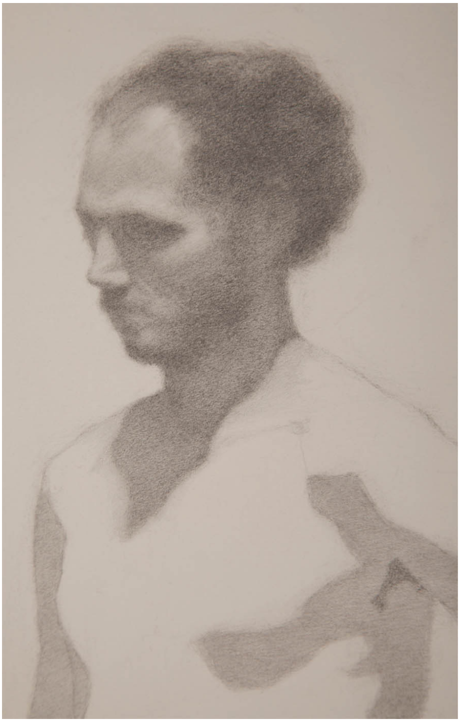


Fig. 187 Beginning to render.

CHAPTER 9

DRAWING THE NUDE: FURTHER STUDY

For the most part, this book has offered a range of factors and information that can be separated out in order to be studied. However, it is important to understand practising a skill as just that: a sort of preparation, and at some point it is important to stop practising and just explore drawing. The best is to make time for both, but to be clear what is being done when. Drawing more freely is a way to see what has been internalized through practice. There are so many factors: anatomy, perspective, value and so on, and we have to be able to think of these things all at once.

Learning a language has a similar level of complexity: context, grammar, vocabulary – there is so much to know and be sensitive to. Similarly in that case the goal is to speak or write, by making time to explore more freely.

The drawing in Fig. 188 has been done on toned paper with black pencil. They have been made in a relatively fast and spontaneous way, attempting to register changes in form, the play of light and so on. As opposed to the sharp space of a diagram, these attempt to include a sense of atmosphere between the surface of the page and the depicted body. In the same way that bone and muscle mesh with fat and skin, light and atmosphere can be considered as further layers or elements to play with and explore.

Also included are examples of sketchbook notations, very economical drawings that are about exploring the feel of anatomical construction, working quickly from memory. Such drawings are a useful way to continue to develop and test your knowledge, and also to enjoy some freedom from more structured work. In terms of pursuing our subject further, we can look to the example of other practitioners and situations for ideas. The next section of this chapter provides two case studies with this in mind.

Fig. 188 The play of light on anatomical forms.

Fig. 189 Anatomy notes – practising a kind of 'short hand' of figure structure is a good way to develop your mental library of information.

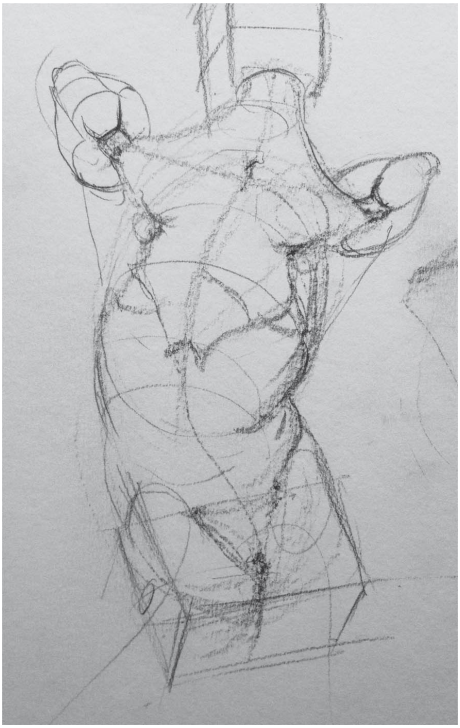


Fig. 190 Anatomy notes on the morphology of the shoulder region.

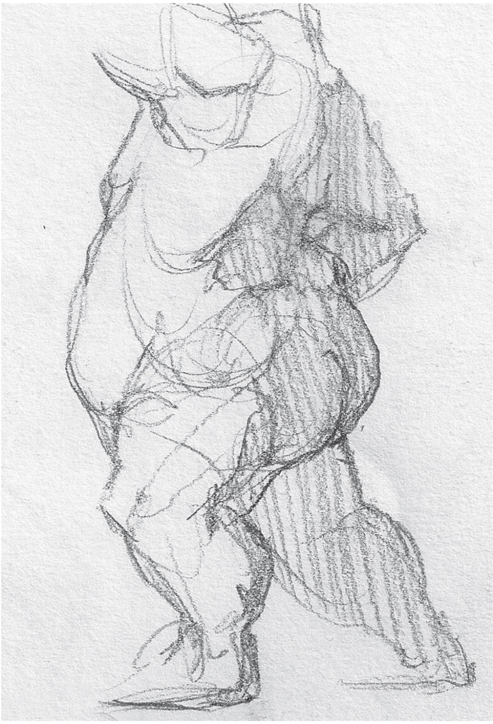


Fig. 191 When drawing from imagination, try to imagine a variety of body types. Experiment – bend and stretch proportion. The areas where you are uncertain provide you with direction for future study.

Case Studies

Eleanor Crook

Eleanor Crook trained in sculpture at Central St Martins and the Royal Academy, and makes figures and effigies in wax, carved wood and lifelike media. She has also made a special study of anatomy and has sculpted anatomical and pathological waxworks for the Gordon Museum of Pathology at Guy's Hospital, London's Science Museum, and the Royal College of Surgeons of England. She exhibits internationally in both fine art and science museum contexts.

She learned the technique of forensic facial reconstruction modelling from Richard Neave, and has demonstrated and taught this to artists, forensic anthropology students, law enforcement officers and plastic surgeons, as well as incorporating this practice in her own sculpted people.

Following a lifelong interest in Northern Renaissance woodcarving, and influenced by the experience of dissecting in order to learn anatomy, she studied limewood carving at the Geisler-Moroder wood-carving school in the

Austrian Tyrol.

In the interest of making figures more lifelike than the living, using a generous grant from the Wellcome Trust she developed the incorporation of electronic animatronics systems into the sculptures so that her moribund and macabre creations now can twitch and mutter.

Eleanor is artist in residence at the Gordon Museum of Pathology, a member of the Medical Artists' Association, runs a course in anatomy drawing at the Royal College of Art, and lectures on the M. A. Art and Science course at Central St Martins School of Art in London. Her work evinces a consistent devotion to human anatomical structure as a vast subject of its own, and to drawing and sculpture as a way of knowing.

Fig. 192 Eleanor Crook – Prosopology of the Dead.

Fig. 193 Eleanor Crook – Prosopology of the Dead.

Scott Eaton

Scott Eaton works across a range of areas, from movie special effects, product design, and contemporary art fabrication. His recent film projects include Stephen Spielberg's *War Horse, Wrath of the Titans, Harry Potter and the Deathly Hallows, Captain America,* and *Clash of the Titans.* If there is a central core to his activity, however, it is anatomy, and he specializes as a consultant on the subject, providing training to already highly skilled professionals in the effects and animation industries, for clients such as Pixar, Industrial Light and Magic, and Disney. These training sessions include a large amount of information and research from the history of drawing and sculpture, medical imaging, and forensic reconstruction.

The examples of his work shown here demonstrate how his anatomical knowledge is applied to developing character concepts for movies and products. Knowledge of human and animal anatomy is combined to allow a freedom of invention whilst maintaining a physical believability. It is significant that Eaton first trained as an engineer, as he emphasizes the connection between how a form looks and what it does.

These examples of his work demonstrate the value of comparative anatomical study. In this case Eaton has researched the anatomy of horses in order to meld this with human anatomy so as to visualize a centaur. The

creation of believable, and in the case of digital artists, animatable forms, requires that they be based in a coherent physical logic.

Fig. 194 Scott Eaton – sketchbook page showing exploration of horse anatomy.

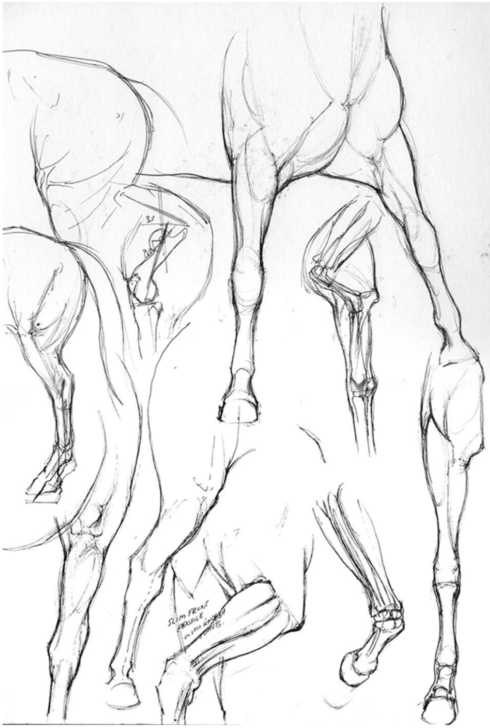


Fig. 195 Many people do not realize the extent of the research, trial and error that informs well constructed figurative work. The repetition shown here allows the artist to work with confidence later on.

Fig. 196 Scott Eaton – centaur digital sculpture.

Fig. 197 Scott Eaton – digital sculpture posing process.

The London Atelier of Representational Art

The London Atelier of Representational Art offers practical training in drawing, painting and sculpting the figure. Its methods are derived from those practised in European fine art academies during the seventeenth, eighteenth and nineteenth centuries. Drawing is considered to be the fundamental skill for these purposes, and this is developed through a series of progressive exercises designed to develop capacities of visual analysis.

Initially students concentrate on developing skill in blocking in a drawing, working from both the figure and from static white plaster casts. When some confidence has been established here, they move on to more lengthy drawings, with the aim of creating a convincing illusion of what is being observed. This is not straightforward information processing: considerations of design and structure are emphasized as essential tools in communicating the effect of realism with the limited means of graphite, charcoal and eventually oil paint. Whilst systems of comparative measurement (discussed in Chapter 8) are used, the primary means of visual analysis is the sight size method.

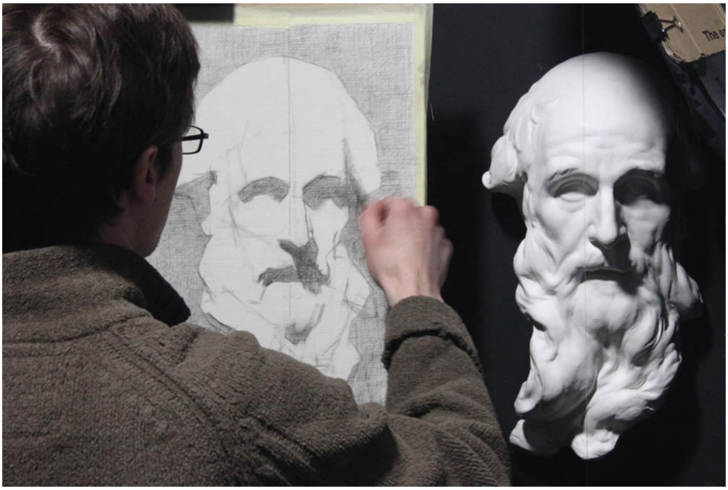


Fig. 198 Sight size drawing at the London Atelier of Representational Art.

Fig. 199 Sculpture at the London Atelier of Representational Art.

Cast Drawing and Tonal Value

Drawing from white objects has the advantage of eliminating variables such as textural noise, movement, and variations in local colour. It therefore offers a way to study and understand the effects of light in a relatively simplified way that is also highly controlled and repeatable. Casts used are often copies of those popular in previous centuries – though in theory it could be any smooth white object. These are available in examples of varying complexity from relatively simple planar structures to highly elaborate forms which are very demanding to render.

Of course, what is studied in this kind of exercise is not simply the effect of light as a physical phenomenon, but also the logics and mechanisms of how to render these on a two-dimensional surface. This question returns us to the concerns of shadow patterns, core shadows and half tones, which we looked at in Chapter 8. The process of learning how to do this is about discovering what creates an effective illusion, though this can be seen the other way about – that it is about developing a sensitivity to where and how such illusions break down in order to critically evaluate shortcomings in one's own work.

Of key importance is learning to detect the shadow line – that point at

which the form turns decisively away from the light source. This is where we will find a core shadow, beyond which is shadow and reflected light. The tonal values used in these areas should be kept separate from those used in the light areas – learning to organize one's materials and values is key to creating a convincing result. Emphasis is on fidelity to the visual impression, and the discrepancies in one's perception as they appear in the drawing. The repetition of these exercises builds both sensitivity to shape, angle and edge as well as experience in processing information across a variety of form scenarios.

By focusing on gaining expertise in one skill before moving on to another, the student's capacity to process complex visual and structural information is increased. A guiding thread throughout this kind of approach is that an efficient strategy is necessary in order to achieve believable results. This relates to another important idea, namely that it is impossible to replicate directly the complexity of what is being observed, whether that be a life model or a static object. This means that from the start we are dealing with questions of selection, editing, emphasis and abbreviation.

Another approach common to many ateliers is the use of Bargue drawings, developed as instructional aids as a part of Charles Bargue's *Cours de Dessin*. A range of drawings made from sculptural fragments, in this case the work of interpreting three-dimensional form has already been done. This confines one's attention to the problems of working with visual relationships on a two-dimensional surface, and to the handling of one medium, usually graphite: the linear block-in, followed by the establishment of the shadow pattern.

Rendering is then begun, working from the shadows out to the half tones. This is the same skill set as is involved in drawing from the cast, but in a sense under yet more controlled conditions. As such this is a method that is often favoured for those who have little or no experience of drawing at the outset.

LARA offers the studio environment and expertise in instruction needed to study efficiently such difficult technical skills in depth. The benefits of such a structured and systematic approach are gained from the focus on primarily technical concerns within a particular type of visual language – substantial enough to be worthy of a volume to itself.

Conclusion

We can identify that the principles in this book relate to a particular tradition of representational art. We can also identify that this tradition is not the only one, and also that it is not at the centre of visual culture in the way that it once was. In acknowledging this, we can recognize that the acquisition of these skills is one thing, whilst what to do with them is another question altogether.

The kind of representational drawing skills outlined in this book exist in many areas of contemporary visual culture. In the context of contemporary art, the paintings of John Currin and the earlier work of Inka Essenhigh have

combined such skills with strategies of appropriation and abstraction respectively. Changes in the relationship of artists to their methods of production mean that the fabrication pipeline for contemporary art can become quite complex, and calls upon many individuals during the execution of large-scale projects. Scott Eaton, whose practice is discussed above, has also been involved in producing large-scale sculptures for artists such as Jeff Koons and Mark Wallinger.

Animation has long relied on specialist knowledge of anatomy and a high level of drawing skill in its more traditional forms. In contemporary visual culture, perhaps the biggest home for such approaches to representing the body would be the movie special effects and video game industries. The software to produce computer-generated imagery changes with the times, but the core skills of figurative drawing and sculpture tend not to. This, and the fact that they are demanding skills to acquire, is why they remain highly valued in those areas.

In my experience as a teacher of drawing, I have found that it is common to hear that being able to draw figuratively is the foundation of all art. As someone who is also a teacher of art history and theory, I would disagree, and argue that the question of foundations is too complex to have such a ready answer. The technical priorities of academic drawing were at one time a kind of *lingua franca* in Western art. However, it is not at all clear that one can easily separate out technical priorities from other factors at play in the making of images and objects. A nineteenth – century society portrait has a very different place in the order of things than the Sistine Chapel ceiling.

Today there are, of course, many and diverse visual languages from a range of cultures and paradigms, and no one set of values or canon agreed upon by all, which some may lament. Indeed, many are attracted to academic training from just such a conservative aesthetic position, whilst others value such training as an interesting activity in its own right, an end in itself. Others still see it as of historical interest. I would put myself in the latter two camps. Whichever position one holds or is attracted to, and whatever one's goals, I would argue that it remains true that there is always the pitfall of emphasizing means at the expense of ends. There is a big difference between valuing the activity for its own sake and valuing the effects for their own sake.

For example, a situation could arise for an individual where the status of technical skill becomes less to do with a particular kind of knowledge, a philosophical position on the world, or an activity part of larger communities of interest, but instead becomes isolated as a criterion in itself, even fetishized. In such cases, drawing becomes for some perhaps more like sport than art. Of course, this is not a problem for those who draw for a hobby (where we simply do what we like), but it might be for those who want more. Why this might be a problem is to do with the very complex question of context, which is beyond the scope of a book of this sort. Nonetheless I think it would be a mistake to ignore the issue, which is why I end with it. I have tried to be mindful of these differences, and to present the information that is here in as open a manner as I can.

This is also the answer to the question I have been asked many times

during the preparation of this book: why do we need more books on drawing the figure, especially those with an anatomical focus? The answer I have come to is that the questions surrounding any activity shift and change character over time, and show up in the emphases – and of course the omissions – that one makes in practical terms. I think we need to see this happen because in doing so there is the chance of lighting up an existing field from a slightly different angle. If this book can do that in a small way, I would be happy. I would perhaps be happier still if it enabled someone else to do so more fully later on, and so this is why I envisioned it from the outset as being a complement to the vast range of material already out there, rather than as a replacement for it.

FURTHER INFORMATION

Suggestions for Further Study

Much of the direct anatomical information in this book is founded on the work of Paul Richer in his landmark book *Artistic Anatomy*.

Scott Eaton's work in developing in-depth training in artistic anatomy is also a source of much valuable information, and his on-line courses are highly recommended to those seeking to study further. For further information, visit his website www.scott-eaton.com.

The London Atelier of Representational Art (LARA) is also due acknowledgement for the rigorous instruction they offer in the specific approach to sight size drawing.

Other Recommended Reading

Robert Beverly Hale's books *Anatomy Lessons from the Great Masters, Drawing Lessons from the Great Masters*, and *Masterclass in Figure Drawing* are full of useful information.

Anatomy for the Artist by Eliot Goldfinger is another key work, as is *Die Gestalt Des Menschen* by Gottfried Bammes, whose drawings are valuable even if one cannot read German.

Andrew Loomis' various books on drawing and illustration are clear and exceptionally comprehensive.

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